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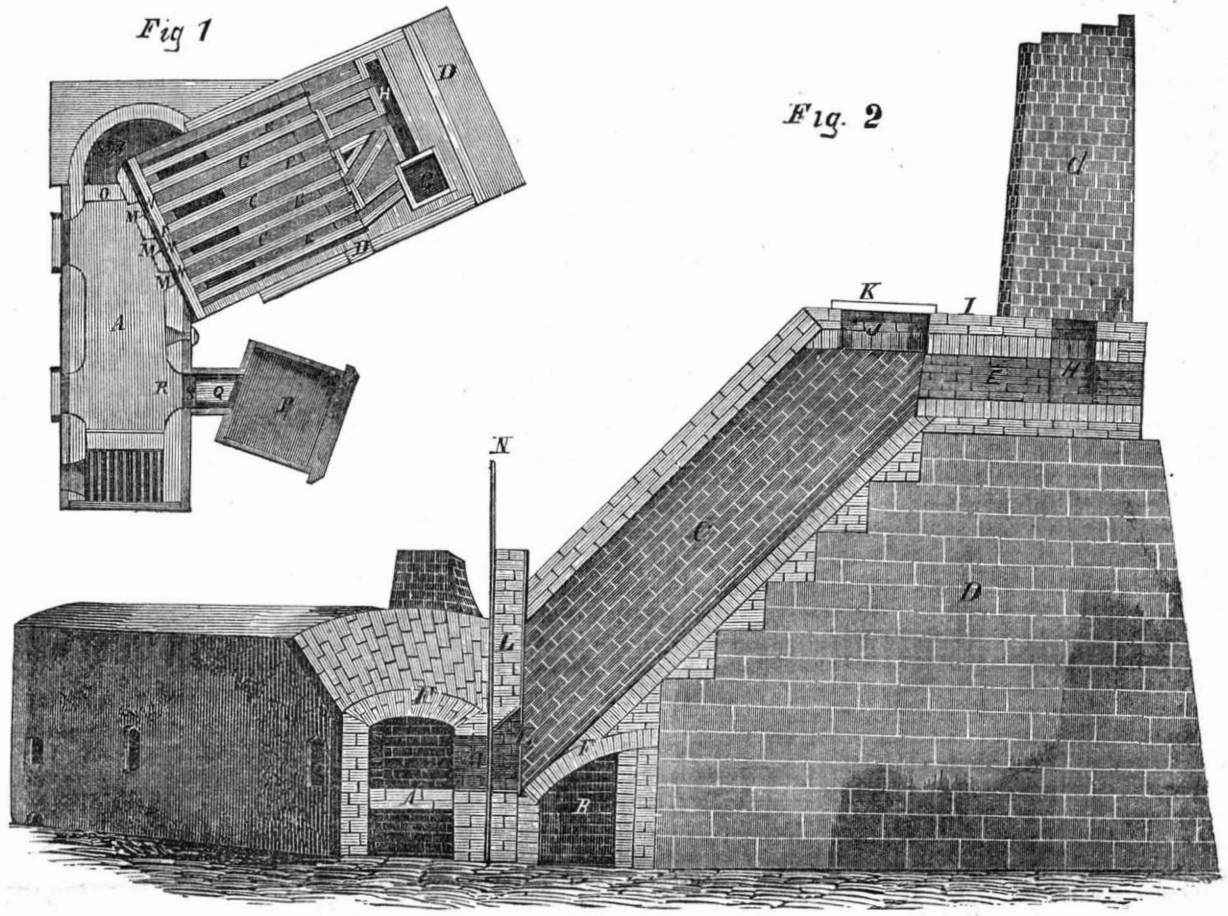
MAKING IRON DIRECT FROM THE ORE.

Fig 1

Fig. 2



Furnaces for making Iron.

The accompanying engravings illustrate an improvement in furnaces for making fibrous wrought iron directly from the ore, for which a patent was granted to Martin Bell and Edward B. Isett, of Pa., on the 14th of last November.

Fig. 1 is a view of the deoxydizing chamber and stack (having the covering of the flues and ore tubes removed) in connection with a like view of a horizontal section of the reverberatory furnace and the forge fire chamber. Fig. 3 is a sectional elevation showing the reverberatory furnace, the flues, an ore tube, the chimney, and general foundation. Similar letters refer to like parts.

The nature of the invention consists of two parts, first, an improvement in furnaces heretofore invented, for making puddled iron direct from the ore, in which the ore is mixed with carbon, and contained in crucibles, closed tubes, or chambers, is subjected to the qualified heat of a furnace, for the purpose of deoxydizing it before it is subjected to the usual purifying and welding process in puddling furnaces, resulting in puddled balls (loupes). The second improvement consists in the combination and arrangement of devices whereby this puddled iron is converted into laminated charcoal malleable iron directly from the hot spongy puddled balls, without a material loss of heat in them, the process being a coutinuous one in producing the iron from the ore, the formation of the puddled balls being only intermediate.

In 1836, Mr. Hawkins, of England, obtained the first patent for making puddled fibrous iron direct from the ore, by deoxydizing it mixed with carbon in close vessels heated by a furnace. In 1847, a Mr. Clay, of England, obtained a patent for the application of the waste heat of a puddling furnace, to deoxydize the ore in close vessels—the deoxydized ore being immediately conveyed to the puddling furnace. In 1839, a Mr. Sanderson, (also of England,) obtained a patent for conveying the hot oxydized ore in a box and rolling it upon a track, and dropping it through an opening into the puddling furnace, thus to economise the heat. In 1841, Mr. Quilliard obtained a patent in our own country for a process nearly like that of Clay's; and in 1850 Mr. Dickerson, of New Jersey, obtained a patent for a furnace combined with a deoxydizing crucible or annular chamber, so placed that the deoxydizing ore may be deposited on the puddling floor, without being exposed to the atmosphere at any period of its reduction into balls. In 1851, James Renton, of New Jersey, also obtained a patent for a furnace to make iron direct from the ore (see engraving of it page 169, Vol. 9, SCIENTIFIC AMERICAN.) The object of this improved furnace is to remedy defects asserted to belong to all those for which patents have been heretofore granted.

A represents the floor of a puddling or reverberatory furnace, of the usual construction, the flue, B, of which is made to pass in a downward direction around to, and thence horizontally back under the lower ends of a series of ore tubes, C C C, which rest at an angle of inclination of about fifty degrees upon a strong stone or brick foundation, D. On both sides of each of these ore tubes, there is left a sufficient flue space, E E E E, communicating with the main flue beneath through the openings, F F F F, in the supporting arch or roof of the main flue, and extending upward on the inclined part of the foundation, parallel with the ore tubes until they leave them at a bend near the top, and pass in horizontal directions into the chimney, G, or into a cross flue, H, which leads into the chimney. The ore tubes C, are each made about three feet deep, eight inches wide, and ten feet or more long, on the inside, and their heating flues, E, of the same depth, and about six inches wide. The ore tubes and their flues are built of fire brick in a substantial manner, and covered with one course of fire and two courses of red bricks. On the top, or filling floor, I, the flues about the mouths of the ore tubes are covered by fire bricks, and on these an iron plate, J, is laid, having an opening 8 x 18 inches through it for each ore tube, and through these openings the mixed ore and carbon is introduced. These openings are also each fitted with an adjustable cast iron cover, K, having a hole in the middle about 4 x 4 inches for the free escape of the gas.—The lower ends of each of the ore tubes, C, communicate by a honizontal opening 12 x 13 inches high and 8 inches wide through an adjoining vertical wall, L, and also through the adjoining side of the reverberatory furnace with the interior thereof, as shown at M M M, and at the lower end of each ore tube there is fitted a sliding gate, N N N, for the purpose of excluding the blast from the tubes, and also for admitting the ore into the furnace as required. And just beyond the opening, M, from the tubes, there is a flue bridge, O, to prevent the deoxydized ore passing into the flue. The reverberatory furnace and the foundation of the ore and flue chamber are placed in a plane at an angle with each other of about 110 degress, for the purpose of affording more convenient access for the workmen to the ore coming from the openings, M, and also because the arrangement admits of a more substantial and durable construction. It will be perceived that the main flue, B, passing in a semicircular direction at the back end of the furnace, returns across under the lower ends of the ore tubes, and passing through the openings, F, is divided so as to carry the heated products of combustion along on both sides of each ore tube, the whole length of each, then open into the chimney through the horizontal flues beneath the filling floors. It will also be perceived that from the peculiar arrangement of the lower ends of the ore tubes being outside of the furnace, and at a distance from the high heat of the flame in the furnace equal to the length of the horizontal opening, M M M, they are perfectly secure against destruction from this cause, which has been stated, rendered Dickerson's arrangement unprofitable, and Renton's intermediate ore receiving box necessary. It will further be perceived that as the ore tubes are constructed of fire bricks, and placed on a substantial bed, at a suitable angle of inclination, the contained ore and carbon lies comparatively loose, or not under the pressure of a superincumbent mass of ore and carbon, impeding the free escape of the gases therefrom, as is the case in all the deoxydizing tubes or ore vessels as heretofore constructed and arranged. And also the angle at which the ore tubes are inclined being only sufficient to cause the deoxydizing ore to descend gradually and directly into the furnace through the horizontal openings, M, when the sliding gates, N, are raised, that the complication of adjustable and stationary valves and inclined planes at the lower ends of the tubes, as required in Mr. Renton's apparatus, are dispensed with.

The second part relates to the combination of a charcoal forge fire or sinking furnace, with above described part of the apparatus. P is the hearth of the forge fire chamber, or sinking furnace, which may be constructed of the usual form and materials. Q is the short connecting trough or inclined way, combining the forge fire apparatus immediately with the reverberatory or puddling furnace. R is the door way, through which an open communication can be made with an inclined trough, Q, and forge furnace. S is a sliding fire proof door, arranged so as to be readily opened or closed, as occasion may require. The forge fire apparatus is placed at an angle with, and as near as may be to the reverberatoryfurnace, having in view the application of the blast and the convenience of the workmen. Laminated charcoal malleable iron, says the specification, has never before been made directly from the hot spongy loupe or balls of fibrous iron taken from the puddling furnace, whether the said loupe or balls were made from pig iron or directly from the ore.

The ore being previously roasted, broken fine, and mixed with the previously ascertained proportion of coal (usually about 20 per cent. of the ore,) is elevated to, and deposited on the filling floor, I, and from which the ore tubes, C, are filled and the covers replaced. The furnace being in blast, the heated products of combustion passing therefrom through the flues to the stack or chimney, bring the tubes containing the ore and carbon to a sufficient heat for deoxydizing or producing a combination of the oxygen of the ore with the carbon with which it was mixed the resulting carbonic oxyd, or carbonic acid gas, escaping through the openings or holes in the lids which cover the mouths of the ore tubes. After the ore is thus sufficiently deoxydized, the sliding gates, N, are successively raised, and the ore sliding gently down into the furnace through the horizontal openings, M, is moved forward (by the workman) on the puddling floor of the furnace to the place where it is in the usual manner brought to mature, and welded into the loupe or balls. At this stage of the process the loupe or balls have heretofore been

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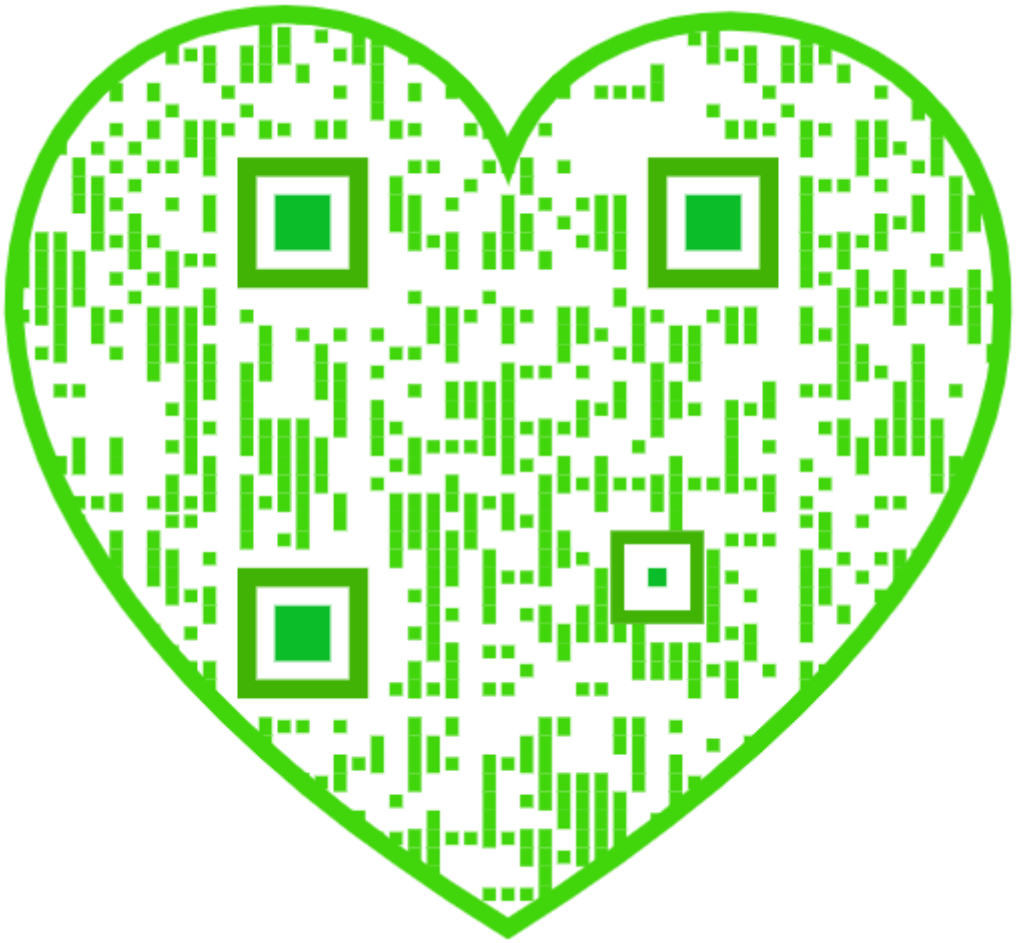

(and if the fibrous iron is desired,) it may now be conveyed out from the furnace to the hammer, and converted by shingling into the puddled bloom; but for the purpose of converting the fibrous iron of the loupe or balls into laminated charcoal malleable iron, the process is continued by rolling or forcing the hot spongy loupe or balls through the opening, R, and by means of the plane, Q, directly into the forge fire or sinking furnace, where the iron of the said loupe or balls is refined and converted into laminated charcoal malleable iron, by means of charcoal in combustion, urged by blast in the usual manner. As the deoxydizing ore is removed from the tubes, the sliding gates, N, are shut down, and the tubes refilled, so that the deoxydizing process continues, and a supply of deoxydized ore may be ready for the puddling floor as the workman may require.

The subject of manufacturing iron direct from ore, has long engaged the attention of iron masters; this furnace for that purpose should receive from them (as it no doubt will) special attention. Every apparatus or process which will reduce the price of iron is of vast importance; for we believe that the quantity of iron used in any country, may be taken as a very good test of its civilization. More information may be obtained by letter addressed to Mr. Bell, at Sabbath Rest, Pennsylvania.

The Art of Dyeing.—No. 22.

DRAB ON SILK—This class of colors, of which there are a great variety of shades, is closely allied to the "buffs." All the difference between them is a small portion of blue added to the latter, and then it becomes a drab. But there are slate drabs, olive drabs, stone drabs, &c., so that the term drab has considerable latitude of meaning in the art of dyeing.

A very excellent stone drab may be dyed on silk by preparing the goods in an alum mordant about 1½°, for one hour, then washing them, and giving them some fustic and logwood in a tub of hot water. The shade can be matched to pattern by the quantity of fustic and logwood used. A half pound of fustic and four ounces of logwood will dye a light shade on ten pounds of silk.

The goods may be made of a redder and richer shade by giving them a weak annatto liquor, and washing them well before they are put into the alum liquor.

This method of dyeing drab colors with the alum mordant has the advantage of enabling the dyer to match any pattern by the addition of fustic or logwood, or a little redwood liquor in the same tub.

The London dyers do not appear to use any logwood in dyeing silk drabs. They use annatto, fustic, and sumac, and darken (sadden) to shade with copperas. This makes a faster color, but not so clear. Copperas cannot be used so successfully for drabs on the reddish shade. Copperas, fustic, and sumac make very good slate drabs.

"A great variety of drabs on silk," says Smith, "may be dyed at a scalding heat with a little vitriol and a little argol, and for fawn shades add a little archil or madder. Some of the finest fawn colors may be dyed in this manner, by adding a little chemic (sulphate of indigo) to sadden them."

FAWN COLORS—This color is a kind of drab. The most simple way to dye it is to prepare the silk with a weak liquor of annatto, and mordant it with alum, as has been described for drab, and dye it in the same manner, only giving more fustic. It is a beautiful color.

BEAVER—This is dyed like the fawn color, only give it a very little fustic. It only wants a very little logwood after it comes out of the alum, care being taken to rinse the goods lightly in cold water after giving the alum. The fustic should always be given first, then when the goods have acquired sufficient depth of yellow, add the logwood in the same liquor. Owing to the greater affinity which the alum has for the logwood than the fustic, unless the former dyewood is first given, more fustic is required, and the color is not so clear. Drabs ought to be dyed quick; the less handling silk receives, the better for preserving its gloss. And unless the goods are handled evenly and quickly they are liable to take on the dye stuffs unevenly. Great care must be taken to wash well out of the annatto, and handle well in the alum. Ashes of roses and Esterhazy colors are merely dark drabs, with the red predominant. They are dyed in the same manner as the alum mordanted drabs, only a little redwood liquor (peachwood or Brazil) is added to the fustic before the logwood is given.

No one can go wrong in dyeing these colors to shade, if he be careful not to put in too much dye stuffs at once. Let him add yellow, red, and darkening, according to the pattern, and work up to the shade cautiously. The bichromate of potash is used by dyers now as a substitute for copperas, in dyeing stone colored drab with logwood.—It is far superior to copperas in producing clear shades.

Curiosities of Science—Combustion.

During a recent lecture, by Prof. Faraday, at the Royal Institution, London, a piece of pure iron, peculiarly prepared so that its particles might present a large surface to the action of the oxygen in the atmosphere, was ignited, and continued to burn like tinder. Some iron filings and gunpowder were mixed together, and sprinkled into the flame of spirits of wine burning on a plate, when the iron filings caught fire and burnt in bright sparks, whilst the gunpowder passed through the flame without igniting and the quantity that fell on the plate was afterwards dried and exploded. Lead prepared in a similar way was shown to be still more inflammable, for it caught fire in a beautiful flame when exposed to the air. Prof. Faraday stated that lead is nearly as inflammable as phosphorus, and he explained the cause of its not burning in ordinary circumstances to be that the solid product of combustion forms a film that prevents contact with the oxygen, and the conducting power of the other parts of the metal draws off and dissipates the heat. He pointed out the admirable arrangements by which these combustible properties of the metal are kept in proper control, and bodies that are really so inflammable are made to serve as strong resisters of combustion. Prof. Faraday next explained the distinction between combustion and explosion, which consists simply in the different rapidity of the two actions, for during the former process the combustible and the supporter of combustion are brought together by degrees, as in the flame of a candle, but in explosions they are both intimately mingled together, and can be brought into action at once. A mixture of hydrogen and oxygen gases, in the proportions in which they are combined in water, was adduced as an example, and a soap bubble blown with those gases was exploded, as an illustration. The cause of the explosion of gunpowder and of other substances that explode without access of air, was shown to be owing to the large quantities of oxygen in a solid state that enter into the composition of such explosives, and being intimately mixed with the combustible, afford an instantaneous supply of the supporter of combustion, which enables them in some instances to burn under water. This was illustrated by several striking experiments, including the burning of a marine fuse. Prof. Farday said, that though animal heat is not, generally speaking, caused by combustion, yet the analogy between the processes is so close, that he could not with satisfaction to himself conclude his lectures on the chemistry of combustion without alluding to the subject. and showing the nature of the changes that are going on in the lungs during respiration. He then arranged some experiments to prove the absorption of carbonic acids in the lungs, and he presented on a plate a mass of charcoal weighing 3 lbs., as representing the quantity that passes from the lungs of a man during every 24 hours. The volume of carbon in the atmosphere, though it contains only one per cent. of carbonic, is, he stated, greater than all the carbon that is stored in coal strata in the earth, or spread on the surface of the globe in vegetation.

Paine's Electric Motor on Exhibition.

A correspondent writing from Worcester to the Boston *Daily Advertiser* of the 16th inst., describes Mr. Paine's invention in a very favorable manner, but in doing so, he shows that the new machine now exposed to the public, for producing the water light, is entirely different from the old one, and involves nothing new that we can see. It is thus described:

"Thirty large horse-shoe magnets, each composed of three bent plates of steel, are arranged around the running wheel, so that the length of the magnet is in the line of the radius of the weeel, and the plane of the horse-shoe perpendicular to the plane of the wheel. The wheel revolves with great accuracy just within the ends of these horse-shoes, bearing, on its circumference, thirty small electro-magnets made of steel wound with wire, which correspond with the thirty permanent magnets. The poles of the permanent magnets alternate, north with south, through their series. By the spokes and axle of the wheel the electro-magnets connect with the battery, and a pole-changer on the axis changes their poles thirty times as the wheel revolves. If I have made myself intelligible, you will see that the whole series of permanent magnets will attract the whole series of electro magnets to a certain point causing so far a revolution of the wheel; at this point the poles change, and a similar revolution goes on till they change again.

Mr. Paine claims that in his arrangement, as he uses battery power only for what I will call the armature, the amount of battery needed for this power is smaller than ever has been used before. He claims also that he overcomes the difficulty generally experienced from the action of the secondary or induced current of electricity.

He estimated the power of the machine exhibited last night at three-horse power, working with three cups of a Grove's battery. The cost of the power gained is merely nominal."

This is simply an electro magnetic engine; the old one was a magneto-electric engine, neither of them his invention. The two are essentially different, for he was to decompose water in his old machine, by giving it motion like a clock by a weight or spring, now he uses a galvanic battery for this purpose. He will obtain just as much gas for light from water without any machine at all, by decomposing the zinc with an acid, and thus save the expense of complicated machinery, which seem to be constructed for the sole purpose of making a grand flourish. Electro magnets are not made of steel, as stated above.

Patent Case.

FAY'S SASH STICKER—Having had many inquiries made lately respecting a recent decision of Judge Nelson, relating to the refusing of a preliminary injunction to restrain G. B. Edgar and others from using Fay's Sash Sticker, on complaint of John Gibson, as being an infringement of the Woodworth Patent,—we would state for general information that we have not received the particulars of that decision. We understand, however, that the Judge refused the injunction on the 25th of last month, alleging as a reason, that as the Fay machine had got into extensive use, it would not be equitable to break up these establishments, when the owners of the Woodworth patent could have a remedy in damages by a trial at Common Law.

The Seventeen Year Locusts.

The seventeen year locusts are expected this year in some parts of Massachusetts.—A correspondent writing to the Boston *Advertiser* of the 16th on the subject, hopes that naturalists will be enabled to obtain a more full and accurate knowledge of their habits and character. He does not seem to be aware of the knowledge which has been obtained respecting them. If he examines page 212, Vol. 6, SCIENTIFIC AMERICAN, he will see figures of this insect in every stage of developement, and a full history of their habits, by Dr. G. Smith, of Baltimore, Maryland.

Charleston Artesian Well.

The Artesian well, at Charleston, S. C., after penetrating to a depth of 1,232 feet, has reached a hard rock, the boring of which is found to be painfully slow and tedious, so that thus far it has only been pierced eighteen inches. It is thought that the aid of steam will have to be called in to move the machinery. The supply of water hitherto obtained has not been of a good quality, nor has the quantity been satisfactory.

A Preventive Against Moths.

Take cloves, caraway seeds, nutmeg, mace, cinnamon, and tonquin, of each one ounce; then add as much florentine, orris-root, as will equal the other ingredients put together. Grind the whole well to powder, and then put it in little bags among your clothes, &c. It is a pleasant perfume, and will keep away moths, although camphor gum will accomplish the latter object equally well.

Boston Line of European Steamships.

A company has been formed in Boston to establish a line of steamships between that city and Liverpool, Donald McKay is one of the principals in it. The capital of it is $2,000,000. In all likelihood, the establishment of such a line of steamers will lead to the Cunard line abandoning Boston as a port, and making New York their constant depot.

Sewing Gloves by Machinery.

MESSRS. EDITORS—You allude in your last to the introduction of the Sewing Machine in our place. There are about two hunrded in operation at present. A majority of the operators are paid by the dozen, and the manufacturers generally prefer paying by the dozen, providing the work is as well done. Sewing machines are destined to effect an entire revolution in the sewing department of the manufacture of gloves and mittens. WM. WARD.

Gloversville, N. Y., May 7th, 1855.

Cod Liver Oil.

It is well known that this oil has been held up by many physicians as a perfect cure for almost every disease. Prof. Bedford of this city, in one of his clinical lectures, asserts, that he cannot boast of much success in using it. He has been compelled to abandon its use, as he found it to disagree with the stomachs of his patients. He has experienced the best effects from the use of olive oil.

Morse Telegraph Case.

A law suit is now going on between Morse versus Smith, concerning their respective rights in the Telegraph Patent. Morse claims $500,000 from Smith—$200,000 of it for Amos Kendall's legal fees. Smith objects to pay such a nice little sum, and we don't wonder at it. It is not a question of infringement, but a dispute among old friends and partners in the same patent.

Hair Tonic.

To two parts (by measure) of the best olive oil, add one of spirits of wine, put them into a bottle, and shake them well together. With this anoint the head well morning and evening. For the first fortnight it should be well rubbed with a piece of flannel into the parts of the head most affected.

The Crops.

Everybody is interested in the prospects of the growing crops throughout our widely extended country. And most pleasant it is to be able to record the general voice of the Northern, Western, and Middle States—that the growing crops never promised better than at present.

Agriculture of Massachusetts.

We are indebted to Chas. L. Flint, Esq., the secretary of the Board of Agriculture, for a handsome copy of "Agriculture of Massachusetts," as shown in returns of the Agricultural Society for 1854. The work contains a great amount of valuable information touching the agricultural operations in the State.

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Care of China and Glass.

The manufacture of pottery in all its branches of earthenware, china, delfware, porcelain, &c., is now denominated the *Ceramic* art. This name, which is derived from the Greek, signifying burnt clay, was originally given to the art of pottery by the French. Like many other arts it had its rise prior to the known date of its history; but from the period when Jeremiah was commanded to "go down to the potter's house," the ceramic art has, till the present day, been steadily improving, calling to its aid every resource of mechanical and chemical science to co-operate with painting and sculpture, till at length it has become one of the most valuable departments of the industry of all nations.

When common clay is molded into a form and baked, it is called earthenware; and it is pretty certain that this was the first step in the art of pottery. When clay is mixed with flinty earth, and afterwards baked, it forms a semi-transparent mass; and as this compound was first known in China, and imported from that country into England, the ware thus made received its present familiar name of "china." A similar compound was first made in Europe in the island of Majorca, about 450 years ago. The articles there made were called *porcelana*, from the Portugese word, which interpreted means "cup," and hence we have the word "porcelain" to denote the finer kinds of pottery.

Of the various preparations used in the ceramic art, and the methods adopted for producing the different "wares," it is not within the province of these remarks to make mention; the preservation of the fragile material after it is manufactured being the object now in view.

For a young housekeeper, from uncle or grandma', as a wedding present, "a set of tea things" or "a dinner service" is—as the dream-books say—"a good token." On the presumption that some of our readers have received such a present, we venture a few hints that may be useful for preserving glass as well as porcelain.

The most important thing to do is to "season" either glass or china to sudden change of temperature, so that it will remain sound after exposure to sudden heat and cold. Now, this is best done by placing the articles in cold water, which must gradually be brought to the boiling point, and then allowed to cool very slowly, taking a whole day or more to do it. The commoner the materials the more care in this respect is required. The very best glass and china is always well seasoned, or "annealed," as the manufacturers say, before it is sold. If the wares are properly seasoned in this way, they may be "washed up" in boiling water without fear of fracture, except in frosty weather, when, even with best annealed wares, care must be taken not to place them suddenly in too hot water. All china that has any gilding upon it must on no account be rubbed with a cloth of any kind, but merely rinsed, first in hot, and afterwards in cold water, and then left to drain till dry. If the gilding is very dull, and requires polishing, it may now and then be rubbed with a soft wash-leather and a little dry whiting; but remember this operation must not be repeated more than once a year, otherwise the gold will most certainly be rubbed off, and the china spoilt. When the plates, &c., are put away in the china closet, a piece of paper should be placed between each to prevent scratches. Whenever they "clatter" the glaze or painting is sustaining some injury, as the bottom of all ware has little particles of sand adhering to it, picked up from the oven wherein it was glazed. The china closet should be in a dry situation, as a damp closet will soon tarnish the gilding of the best crockery.

In a common dinner service it is a great evil to make the plates "too hot," as it invariably cracks the glaze on the surface, if not the plate itself. We all know the result—it comes apart; "nobody broke it," "it was cracked before," or "cracked a long time ago." The fact is, that when the glaze is injured, every time the "things" are washed the water gets to the interior, swells the porous clay, and makes the whole fabric rotten. In this condition they will absorb grease; and being made too hot again, the grease makes the dishes brown and discolored. If an old, ill-used dish be made very hot indeed, a teaspoonful of fat will be seen to exude from the minute fissures upon its surface. These latter remarks apply more particularly to common wares.

In a general way, warm water and a soft cloth is all that is required to keep glass in good condition; but water bottles and wine decanters, in order to keep them bright, must be rinsed out with a little muriatic acid, which is the only substance that will remove the fur which collects in them; and this acid is far better than ashes, sand, or shot; for the ashes and sand scratch the glass, and if any shots are left in by accident, the lead is poisonous.

Richly cut glass must be cleaned and polished with a brush like a plate brush, occasionally rubbed with chalk; by this means the luster and brilliancy are preserved.

SEPTIMUS PIESSE.

London.

Brass Formed by Galvanic Agency.

Copper is more electro-negative than zinc, and separates easier from its solutions than a metal less negative. If, then, in order to obtain a deposit of brass by galvanic means, we employ a solution containing the two component metals, copper and zinc, in the proportions in which they would form brass, there will only be produced by the action of the battery a deposit of real copper; the zinc, more difficult of reduction, remains in solution. What must be done, then, to obtain a simultaneous precipitate of the two metals in the proportions required, is either to retard the precipitation of the copper, or to accelerate that of the zinc. This may be effected by forming the bath with a great excess of zinc and very little copper. Dr. Heeren gives the following proportions as having perfectly succeeded:—

There are to be taken of Sulphate of copper	1 part
Warm water	4 "
And then Sulphate of zinc . .	8 "
Warm water	16 "
Cyanide of potassium . .	18 "
Warm water	36 "

Each salt is dissolved in its prescribed quantity of water, and the solutions are then mixed; thereupon a precipitate is thrown down, which is either dissolved by agitation alone, or by the addition of a little cyanide of potassium; indeed it does not much matter if the solution be a little troubled. After the addition of 250 parts of distilled water, it is subjected to the action of two Bunsen elements, charged with concentrated nitric acid, mixed with one tenth of oil of vitriol. The bath is to be heated to ebullition, and is introduced into a glass with a foot, in which the two electrodes are plunged. The object to be covered is suspended from the positive pole, whilst a plate of brass is attached to the negative pole. The two metallic pieces may be placed very near.

The deposit is rapidly formed if the bath be very hot; after a few minutes there is produced a layer of brass, the thickness of which augments rapidly. Deposits of brass have been obtained in this way on copper, zinc, brass, and Britannia metal; these metals were previously well pickled. Iron may, probably, also be coated in this way; but cast iron is but ill adapted for this operation.—[London Mining Journal.

[The above may be a practical receipt, but we have not had an opportunity of testing it yet. We present it as a subject of some importance, as it has been held to be impossible to electrotype bronzes of any kind. Some of our readers will no doubt soon test the value of Dr. Heeren's receipt.

To Preserve Hams in Hot Weather.

The best way to preserve hams during hot weather, is to sew them up in stout cotton bags, cover them with charcoal dust in barrels, and keep them in a dry cool place.

California Academy of Sciences.

The proceedings of this Association are regularly published in the *Pacific* (San Francisco,) and they show that its members are very active, especially among the fishes. Drs. Trask and Ayres are enriching the science of ichthyology with valuable contributions derived from the waters of California.

PRESERVING TIMBER—To these two gentlemen (Drs. Ayres and Trask,) as a committee, had been referred the subject of examining a new method of preserving submerged timber from the attacks of the ship worm.—They made a report on the 2nd of April, in which it is stated that the method was a failure. A Mr. Swan had coated a set of "ways" in the ship yard of Neefus and Tichnor with a preparation to resist the attacks of the *toredo*, and it was stated, that while other "ways" beside those uncoated had fallen before the worm, the prepared ones were quite sound. This was found to be true only for a little time; the prepared "ways" had but delayed for some months the attack of the *toredo*; they were now being also rapidly destroyed.

This forms a subject of great regret to the Committee, as a great many buildings in the lower part of San Francisco are built on piles which they say "must sooner or later yield.' A block of buildings fell in March last that had been built on piles. as a warning to all the others, the piles on which they rested being found bored to a honey comb, and had been driven in only about twelve months.—A remedy for the attack of the ship worm would be a grand desideratum for San Francisco.

CALIFORNIA BALSAM APPLE—Dr. Kellogg presented some specimens of this plant.—"One of the most remarkable features of this climber is the gigantic fleshy root which shoots its numerous branching angular stems from ten to thirty feet in length, and climb over and festoon the shrubs within their reach with a dense, green, broad, roundish foliage, somewhat heart-shaped. The claspers or tendrils by which it clings are many parted, or from one to five. From the intense bitterness of the root it must prove an excellent tonic. The seeds abound in oil, which burns with a clear bright flame, with little or no smoke or odor. It is readily obtained by simply bruising and pressure. There is also a pungent acrimony in the larynx and throat after chewing the pits, besides a bitter laxative property."

He also exhibited specimens and a drawing of a new and singular personate leafless plant.

Also a specimen from the hills of Mission Dolores, known as the creeping sunflower—a name probably suggested by the habits of the stem. Rising and bowing archwise, it hugs the soil, creeping beneath the grass about a foot from the radiated cluster of root leaves, then ascending in a curve a few inches from the earth, crowned with a single flower; or perhaps also from the creeping character of the root.

Works on Chemistry.

MESSRS. EDITORS—I notice in your paper of the 28th April, in reply to C. W. C., of Indiana, you say that "Graham's Chemistry is a most excellent work;" this is true, but I do not think any but quite an old edition can now be obtained in this country; it is true that in 1852, Blanchard & Lea published the *first part* of a new edition, and stated, in a note appended to the preface,—"The concluding portion may be expected for publication during the present year (1852) when the whole will be presented in one volume." Knowing the valuable character of the work, I was induced to procure the first part, and have waited patiently as I could for the second part, but have as yet been disappointed. Whether this treatment of the public is honorable, I shall leave to others to determine, but I thought some of your readers might be saved trouble and disappointment by a knowledge of the facts.

S.

Detroit, May 9, 1855.

[We publish the above letter as information to those who may be desirous of procuring good works on chemistry. We have been placed in the same position as our correspondent, and have given such information to those who have made inquiries of us. We really hope that Messrs. Blanchard & Lea, will soon issue a complete new edition of this valuable work.

Sun Painting Discoveries.

MESSRS. EDITORS—Your correspondent, Mr. Joseph Fitzpatrick, certainly misconstrues my article on daguerreotypes. You very justly remark, that I do not claim the discovery of the camera obscura, for that had been discovered, as Mr. F. states, by Baptista Porta, and he might have added, two hundred years ago. But was that camera ever used for any practical optical purposes, for taking daguerreotypes? Sir David Brewster says, "that it cannot be used for any optical purposes" (page 23, Brewster's Optics,) and that neither Mr. Hunt nor Mr. F. understand the subject correctly, is made self-evident from the assertion, "and by putting a small lens over the hole, they are rendered much more evident," &c., as it will be found upon trial, that by placing any kind of lens either before or behind the size hole I took those pictures through, that the pictures are *not* made to appear either more sharp or distinct. Moreover, it is self-evident from their own language, that neither Mr. Fitzpatrick nor Mr. Hunt ever took a daguerreotype by the means pointed out by me in that article.—From the very fact that they mention lenses at all in this connection, it appears that they never experimented with holes as small as those with which those pictures were taken (especially those now in possession of Wm. H. H. Snelling, of New York). The declamation of Mr. Fitzpatrick about giving "credit where credit is due" is all gratuitous.

In conclusion, I may state what I actually claim; first, I claim to be the first who ever took daguerreotypes without lenses or reflectors through very small apertures. Secondly, the first who took stereoscope pictures by the same means, showing proper and sufficient relief, taken at an angle no greater than the angle of the optic axis of the human eyes. Thirdly, the first to point out the true cause of the distortions noticable in pictures taken with lenses larger than the human eye. Fourthly, the first to explain why stereoscope pictures taken with common cameras placed only 2½ inches apart do not show proper stereoscope relief.

JOHN F. MASCHER.

Philadelphia, May 10th, 1855.

Bathing the Open Eyes in Cold Water.

MESSRS. EDITORS.—I observe in the SCIENTIFIC AMERICAN of the 12th inst., an extract from *Hall's Journal of Health*, condemning the practice of bathing the open eyes in cold water. My personal experience is strongly in its favor. I am 67 years of age, fifteen years ago I required slightly magnifying glasses, and then commenced the practice of daily immersing the face and open eyes in cold water, for the space of about a minute. My vision has not grown aged since, and I now use my first glasses.

My wife, nine years my junior, and whose open eyes have never been in contact with cold water, did not require her first spectacles for six years after mine, but her eyes in the meantime have grown so aged, that my weak glasses are no assistance to her vision, and her strong ones obscure my sight. We have both had pretty good health—she the best.

THOS. W. BAKEWELL.

Cincinnati, O., 1855.

To Ignite Damp Matches.

A damp match will light readily by first holding it to the arm or other warm part of the body for a few seconds, until it attracts a small amount of heat, then rubbing it gently on woolen cloth of close texture, such as doe-skin, or what is commonly used for pantaloons. It will ignite if the composition is almost as soft as putty; woolen cloth is the best to use in that case, as it causes little friction, and is a good non-conductor of heat.

HUGH KEENAN.

Boston, 1855.

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New Inventions.

Improvement in Saw Mills.

The annexed figure is a front view of an improvement in saw mills, for which a patent was obtained by Isaac Brown, of Baltimore, Md., on the 19th of July, 1853, but which has never before been thus brought before the public. Every improvement in saw mills interests a very large class of our people; the great majority of which, we believe, are readers of the SCIENTIFIC AMERICAN.

A is the engine frame, also answering for fender posts to saw mill. B are cross-heads, also saw gate sliding against fender posts. C are saws strained between the cross heads or in saw gate. D is the steam cylinder, firmly bolted between the fender posts, with piston rod extending through both heads of the cylinder, resting between top and bottom cross girts of the saw gate in substantial bearing surfaces, E, leaving the ends of the piston rod unrestrained to work in line with the cylinder, and with freedom to the piston, to revolve in the cylinder, allowing the surfaces of the packing rings and cylinder to adjust and wear more smoothly and prevent cutting, than can be obtained when the piston is rigidly fixed in the cross head. The steam chest and valve motion are of the usual construction. F is the end view of carriage with the head blocks, G, and dogs to secure the logs while being sawed. H are racks and pinions to give the desired motion to the carriage. I are rolls under the carriage, and guides by the segments to secure a straight line for the carriage. J are pulleys so arranged in connection with clutches, tightening pulley, and belt, to back the carriages for either saws. K are crank fly wheels for the engine regulating the motion and stroke of the saws by the connecting rods, L, secured firmly with the lower saw buckles and crank pin, M, thereby giving firmness to the cut of the saws by the momentum of the fly wheel. N is the eccentric to give motion to the valve in the steam chest (not shown.) O is the eccentric to give motion to a rock shaft for feeding the carriages forward with the logs to the saws, and readily adjusted while the saws are cutting to give any required feed to either saw. P is the pulley for pump to supply boilers in the usual way. Q is the stand and pedestal to support engine frame, fly wheels, and shaft. R are foundation timbers well bolted together. S is the pulley to give motion to any machinery desirable, as circular saws to saw lath, pailings, edging boards, as well as for small portable mills for grinding grain, or any purpose, as the engine will work as efficiently without working the upright saws as any other engine of the same boiler power.

The best site to erect this mill upon is a sloping ground, with a wall on the side next to the high side, to keep back the ground; and excavating a foundation on the lower side giving sufficient elevation for room to work under the mill and get out the sawdust, chips, and wastage at a convenient elevation to the mouth of the boiler furnace, to use as fuel.

The logs on the elevated ground above the mill can be readily put on the carriages for sawing, and the lumber turned off at the lower side, thereby avoiding much labor of handling heavy lumber when the locations are not well selected.

A space ten feet square in the saw pit is sufficiently large for the machinery below, and a width of room above, say fourteen feet wide by double length of the timber desired to be sawed, and one story of eight feet high, with sufficient covering to keep out the weather, is all that is desired. The wall under and outside of the boiler walls will answer to support the machinery. This mill will do as much work as any other with the same number of saws driven in a saw gate. As much power may be given to the saws as will force them into the wood at each cut, as far as the saws are able to withstand the resistance against them. As regards keeping all the parts in order, this depends on the workmanship of the machine itself, and the parties using it. The principle of the construction of this mill, Mr. Brown says, renders it less liable to get out of order (it having no more than one half the number of parts) than other steam mills, while, at the same time, it has an important feature in the engine itself that avoids one of the greatest difficulties in sawing, viz: getting out of line and cutting the cylinder, an evil to which all other engines are liable without the greatest care.

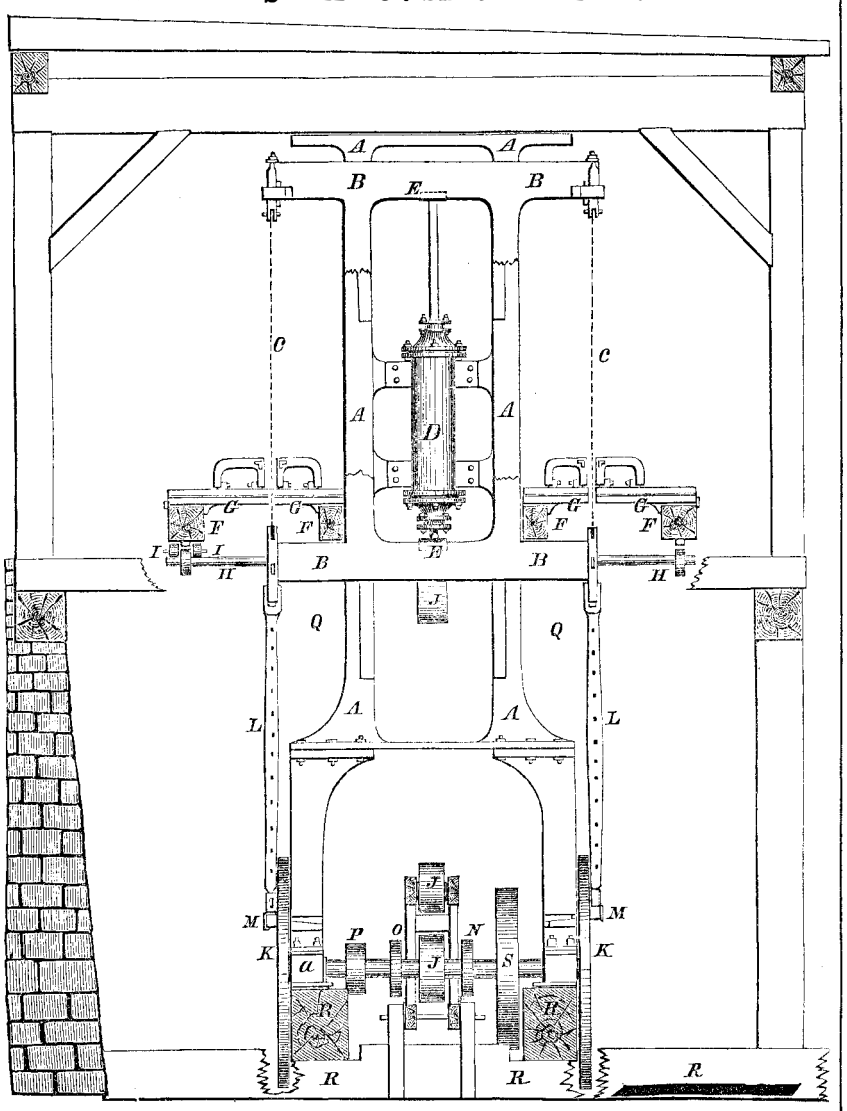
A less number of workmen can keep it in operation, and do as much work. The engine is under the control of the sawyer, who is also the engineer, and regulates the speed to suit the work; and he alone can perform all the work of sawing after the logs are put on without stopping the mill, thereby needing ordinary hands only for handling lumber, cleaning up the sawdust and wastage into the furnace, to keep up the steam.

This mill can be completed at the machine shop, requiring not more than ten days to put it up on its foundations, they being prepared. He is now constructing double gangs carrying fifty saws, cutting at the same time, with rollers and feed power, making a continuous cut at the timber, the logs following each other through the gangs, and cutting up the lumber to any dimensions, with rapidity and accuracy, thereby making a most substantial machine for sawing.

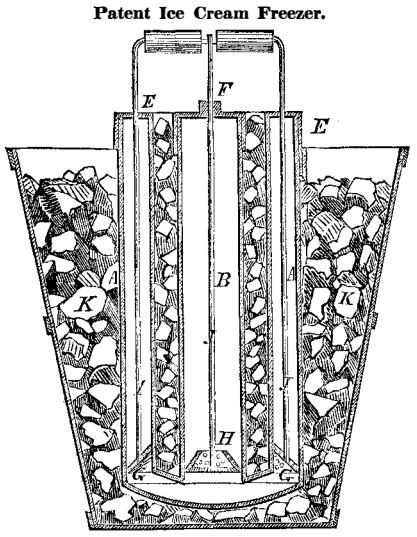
Mr. Brown has devoted thirty years to the working of steam saw mills, and will superintend the construction of his mills, if required, until they are in satisfactory operation.

More information may be obtained by letter addressed to him at Baltimore.

BROWN'S IMPROVED SAW MILL.



Patent Ice Cream Freezer.



The annexed figure is a vertical section of an improved Ice Cream Freezer, for which a patent was obtained by Thomas M. Powell, of Baltimore (88 Howard street,) Md., on the 5th of last September, and as the season has now arrived when such articles will be extensively brought into requisition, it is a very appropriate time to present this one to the attention of the public.

The nature of the invention consists in constructing ice cream freezers with three cylindrical chambers, two of which, the center and outer ones, serving for the cream, and the intermediate one for the ice. By thus constructing the freezer, and surrounding it with ice, and filling the intermediate chamber with the same, the cream will be exposed to three freezing surfaces instead of two, as in other freezers, and will be more speedily and effectually frozen than by other freezers in use.

A represents the outer cream cylinder; B is the inner or central cream cylinder, and C the intermediate ice chamber or cylinder. The cylinder, A, is made separate from those, B C, and is made in the ordinary manner. Those, B C, are united together by the plate which forms the bottom of the intermediate ice cylinder; and B is made open at the bottom, so as to communicate with the outer cream cylinder, A, and to receive the cream as it is poured into the cylinder, A, and admit of it coming in contact with the freezing surface of the chamber, C; and C is open at the top, so as to receive the ice, as shown in the engraving.

E is the top of the cylinder, A; it is attached fast to the ice cylinder, C, and is lifted off the cylinder, A, when said ice cylinder and the central cream cylinder are raised out of the cream cylinder, A. F is the top of the central cream cylinder. G H are the reticulated funnel-shaped agitators, arranged inside of the cylinders, A and B. I I and J are wire rods attached to the agitators and carried up through the tops of the cream cylinders, and connected together, and made to serve as a handle to raise the agitators. K represents the ordinary ice tub, in which the freezer is placed.

The cream being placed in the cylinder, A, and said cylinder set in the ice tub, K, and the intermediate cylinder, C, filled with ice, the agitators are gradually worked up and down by the handles, I I, and J. This operation lightens the cream, and removes the cream congealed from the surface of freezer to which it is exposed, and thus gives place to that in a liquid state, and thus the operation is carried on until the cream is perfectly frozen, which takes place in a very short time, owing to the congealed cream being displaced, and the uncongealed allowed to take its place. After the cream has been exposed to the freezing surface a suitable length of time, the inner cylinders are removed, and the cream covered up and set aside for about four minutes, when it will be fit for use.

More information may be obtained by letter addressed to Mr. Powell.

Chloroform in the Crimea.

From a communication lately made to the Academy of Science, by one of the surgeons belonging to a French regiment in the East, it appears that chloroform has been very extensively employed in the cases of wounded soldiers in the Crimea, and with most successful results. The apparatus used was of a most simple character, consisting of a piece of twisted paper, of a conical shape, with the wide end large enough to cover the mouth and nostrils of a patient, and cut round at the sharp end, so as to admit the passage of air. A piece of lint placed at this narrow end served to receive the chloroform, of which from twenty to thirty drops were poured on it. The patient being then placed on his back, with a bandage over the eyes (light being found to materially impede the effects of the inhalation,) the little paper bag was placed closer and closer to the mouth.—When insensibility appeared fully established the operation was commenced, and if it so happened that it continued longer than the effects of the inhalation, a second, and sometimes a third dose of chloroform was let fall on the lint, and allowed to be inhaled, but always in an intermittent manner. This plan was employed in the case of every man in the French army, badly wounded at Alma and Inkermann, and all without the slightest accident. "Its results," says the account presented to the Academy, "from the vast number of experiments witnessed, that it is not by any means necessary to carry the absorption of the chloroform to the extent of destroying all power of movement—in fact, that there is danger in crossing the line which separates the abolition of sensation from the abolition of motion."

Letters from Paris.

In the next number of the SCIENTIFIC AMERICAN we shall commence the publication of a series of letters from Mr. WALES, of this office, who is now visiting the great Exhibition in Paris.

The United States will make a sorry show at the Great Exhibition, and every American who visits it will turn away with a sad heart as he passes through the apartment allotted for the display of our inventive talents.

Mr. Wales' letters confirms the report which has been made in some of our daily papers, that but one Commissioner is to be recognized from each State; and then there is every prospect that more Commissioners will be present than the number of articles on exhibition. The State of New York is to be an exception to the above rule, however, two Commissioners being allowed by the Imperial Commission to represent the Empire State—Mr. Fleischman and Mr. Wales.

Errata—Table of Patents.

In the table of patents on page 267, the two following typographical errors occurred, Vermont (class 12) instead of 9, it should be 0. Georgia (class 6,) instead of 0 it should be 1.

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Scientific American.

NEW YORK, MAY 26, 1855.

The Ericsson Steamer Again.

On the 12th inst. the *Ericsson* made her second steam trial trip down the Bay, with the owners, engineers, and a number of invited guests on board. Speeches were made, toasts were drank, and high compliments were paid to the genius which had contributed to make this vessel, as a steamship, surpass all others, by some new inventions in economising fuel. The New York *Tribune* of the 14th says respecting it, "Capt. Ericsson claims to have made a very important improvement by his new condenser.—The saving is great in fuel, in the wear of the boiler, and the labor of cleaning it through the use of fresh water in lieu of salt. Altogether, as a steamship, she comes near the caloric standard of cheapness of power."

What the caloric *standard* of cheapness of power is, must belong to the *Tribune's* system of indefinite engineering, as it says, "the speed of the ship on her trial trip was about twelve miles per hour, with an alleged consumption of three-fourths of a tun of fuel per hour." And all this by the substitution of outside for inside condensers. Prodigious! We have no hesitation in asserting that this is not true; also that this vessel will use just as much coal in proportion to the steam power she exerts as any other steamer in our country. An outside condenser has only the advantage of being easier cleaned than the boilers of a steamer using salt water; but it cannot save fuel on this account. Nay, it will require more fuel, as the condensation of the steam, by metallic surface refrigeration, is eight times slower than by direct contact—injection. The faster steam can be condensed, with the same quantity of water, in any engine, the greater must be its economy; this is self-evident.—Capt. Ericsson is not the first inventor of surface condensers. This method of condensing steam is older than by injection.

Two years and four months ago, exactly to a day, (Jan. 12th, 1853,) the same vessel, known then as the "hot air" *Ericsson*, made her *successful* second trial trip down the Bay, with a great number of invited guests aboard also, and a grand time some had of it. The editorial corps of the New York Press, professedly and really shrewd on general subjects, were completely gulled on the occasion. They were told by Capt. Ericsson that he heated 1560 tuns of air up to 450° in twenty-four hours, with six tuns of coal (260 tuns of air by one tun,) and they actually swallowed the *faggot* as if it were a sugar plum. Capt. Ericsson also told them that it was difficult to make his furnace too hot, and that the heat produced no ill effects upon the bottom of his heaters. With such statements—ignoring their very senses—they were filled brim full of enthusiasm for *caloric* and *hot air*, and one of them pronounced a funeral oration over steam, while another sung a requiem over the memory of Watt and Fulton, to the tune of "the days of steam are numbered, and Ericsson is the ruling genius of the present." With the accounts which were then published in the daily papers, the whole country was electrified, for the people could not believe that so many respectable men could or would propagate for truth so much that was untrue.

The success of the hot air *Ericsson* was pompously and dogmatically declared to be a *fixed fact*; and hundreds of orders, it was asserted, poured in upon Ericsson himself for hot air engines. The proprietors of the New York *Evening Post*, made arrangements with him for a hot air engine to work their presses, and many began to sneer at steam and call its advocates old fogies.

What now do we see as the climax of all the fuss and fury then exhibited respecting the "caloric ship?" Why we behold it, after having cost more than half a million of dollars and two years tinkering, converted into a steamship, and hot air abandoned as an unsuccessful project.

Having said so much on this subject (although we could say much more,) we suppose our readers are about tired of it. Were it not for the particular circumstances of the case at this time, we would not have touched the question; but these justify us, especially in the correction of erroneous statements, as the *Tribune* still asserts that the hot air engine theory has not yet been proven practically unsound. We hope no person hereafter will again be deceived by such an assertion. Hot air never will supersede steam as a motive agent. Theoretically and practically, it has not the favorable qualities of steam as a motive agent. No better evidence has ever been afforded to the world in proof of this than the *Ericsson* itself, and it gives us pain to see any person so blind to facts and candor as to deny this.

Coal Fields of Turkey.

Near Heraclea, on the Black Sea, there are some fields of excellent coal, which but for the indolence and want of enterprise in the Turks, might long ago have been the means of assisting in the regeneration of the manufactures of their country. These fields, however, are being worked at present, and have been feebly since 1850, and it is expected that in a short time they will yield sufficient for the purposes of steam navigation on the Black Sea, and the army in the Crimea. The mines are only about 12 hours' steaming from Constantinople, and the seams vary from 3 to 12 feet in thickness.

The country in which the coals lie is varied with hills and dales, resembling very much, in its general features, the mining districts of Wales, those in the neighborhood of Liege, in Belgium, and Aix la Chapelle, in Prussia; and the coal stratum is distinctly seen on the section of the sea-cliff for more than 40 miles along the coast. The want of fuel has been most acutely felt in the Crimea, and steam-coal has been supplied to British shipping in the Black Sea at heavy expense.

The supineness of the Turks has been the source of all the difficulties in mining coal and making iron to supply themselves, for they have an abundance of these minerals.

The Oxygen of the Atmosphere.

Two weeks ago (on page 273) we noticed the ridiculous idea put forth by Daniel Vaughan, namely, that a removal of some of the oxygen from the atmosphere quickens the intellectual faculties and developes the finer feelings of the mind; and stated that this was an erroneous notion. In confirmation of our views, we find it stated in the recent lecture of H. Macworth, read before the London Society of Arts, that a deficiency of oxygen of 10 per cent. in the atmosphere of mines produced stupor quickly and eventually death. We hope no student will act upon the idea of Mr. V., in an endeavor to quicken his mental faculties, by studying in an atmosphere deprived of any of its oxygen.

The Maynooth Battery.

About two months since a correspondent made the inquiry of us, "What kind of galvanic battery is it which is called the Maynooth or Callan's Battery?" We informed him that we had read considerable about it in foreign journals, but were still in the dark respecting its true nature,—in other words, wherein it differed from other batteries. We promised, however, to keep a look-out for the information he requested. This we have found in a recent number of the London *Mechanics' Magazine*, contained in a letter of Prof. Callan himself, in answer to some person who disputed its title (the battery's) to novelty or usefulness.

From the long letter of Prof. Callan, of Maynooth, we learn that his battery consists of cast iron, for a negative metal, and amalgamated zinc for a positive metal, and the use of a single fluid, instead of two different fluids in separate cells, such as nitric acid in one (negative,) and dilute sulphuric acid in the other (positive,) as in the Grove battery.

The single fluid used by Prof. Callan consists of diluted muriatic acid, or muriatic and sulphuric acids mixed together, and diluted with a little more than twice their quantity of water; (salt and sulphuric acid answer the same purpose.)

All that is new about the battery is the exciting of the cast-iron and the zinc, by the same fluid. The fluid itself is not new as an excitant, nor is the cast iron new, as a solid element, but these two metals, he asserts, have never been used together before, and excited by the same fluid.

Universal Weights and Measures.

Our readers will remember that on page 251 we recommended, in common with the Philadelphia *Ledger*, the adoption of universal weights and measures to supersede our present inharmonious and absurd systems. By the last news from Europe, we perceive that the British Parliament has made a movement to effect such a reform. The movement is a proposition to hold a Congress of Nations for the purpose of agreeing upon a common system of weights and measures.

We hope this proposition will be adopted in Parliament, and reciprocated by every civilized nation. Our country will surely give a hearty response to the suggestion; and the war in Europe should not prevent the contending nations joining in such a Congress for so important an object. It is a scientific as well as a commercial question, and as science makes all men brothers, men of all nations can meet for consultation on this platform, consecrated by the bonds of peace and good will. In a few years we hope to see a universal system of weights and measures prevailing throughout the whole world.

History of Staining Glass.

At a meeting of the Farmers' Club of the American Institute, held in this city on the 8th inst., Prof. Mapes stated that "a few years ago the art of staining glass was unknown, when at a club something like this—only composed of mechanics—a member stated he had stained glass blue with cobalt, and another, that he could color it red with ease, but not blue, until finally others came forward with their facts applied to other colors, and when all were combined, the result was a mass of facts that has produced the beautiful combinations of colored glass equalling the art when it was applied to the old cathedral windows, centuries ago, in Europe."

This was a strange statement to make for such an old professor of chemistry. The art of staining glass has been known for centuries, and although it ceased to be practiced, but to a limited extent, during the 17th and 18th centuries, still it never was lost. It is described in all the old works on glass-making and ornamentation.

Hoard's Gas Regulator.

On Wednesday last week, we witnessed the successful operation of the gas regulator of J. W. Hoard, of Providence, R. I., for which a patent was granted on the 13th of March, and the claim published on page 222, Scientific American. The exhibition took place in the gas meter manufactory of Samuel Down, at the foot of 22nd street, North River, this city—Mr. Down conducting the experiments.

The object of the apparatus is to regulate the supply of gas to burners, and render it uniform though the pressure in the main or street pipe may be unequal or irregular. We saw the regulator tested with a gauge on the main and another on the burner pipe, and it operated correctly, although the pressure on the main gauge was purposely made to vary considerably. There were six burners employed to test the small regulator, and we could perceive no difference in the pressure when one or the whole of them were burning—or when two or more were shut off,—it operated accurately under every test. This gas regulator of Mr. Hoard is so constructed with a spring pressure cup that it will not clog if any tar should pass over, a fault belonging to other regulators that have heretofore been used. When it is put into operation it will continue to work without interruption. Applied to a house where gas is consumed, the supply to the burners is uniformly regulated at any pressure below that of the street, consequently it will save a great expense to consumers, as much loss is, in general, caused by the irregular pressure of gas in the street pipes.

A high pressure on a burner, while it wastes the gas, produces a feeble light; whereas a properly regulated pressure on the burner, while it saves gas, produces a softer and better light.

This regulator of Mr. Hoard is very simple and neat in construction, not liable to get out of order, and Profs. Torrey and Gibbs, and other chemists of this city, who have witnessed its operations, have expressed their opinions commendatory of it. Patents are now being taken for it in Great Britain, France, and other countries in Europe, and it appears to us, that it ought and will win its way into general use.

The Olive Culture.

As the Patent Office has distributed a number of olive cuttings among various planters in different Southern States, we hope they will receive that care and attention which we think they deserve. The successful cultivation of the olive, for the sake of its oil, would be of much benefit to our whole country. It is scarcely possible to get any pure olive oil in this or any other city in America. Nearly all that is sold for such is adulterated lard oil. As an article of use for the table, pure olive oil is sweet and pleasant to the taste. For perfumery it ranks higher than any other, and for making the finest kind of soaps it has no superior.

In medicine for anointing the bodies of those who have weak lungs, and are predisposed to consumption, Dr. Simpson, of Edinburgh, has found it to be very healthful and invigorating; and as a substitute for cod liver oil, to be taken as a medicine, Prof. Bedford has awarded it a high character. For these reasons we hope the cultivation of the olive in our country, will prove entirely successful.

Guano for Insects.

A correspondent of the *Horticulturist* says "Some time last summer, while budding some young peaches, I found that ants had taken possession of some ten feet in one row. They very earnestly resisted my attempts to inoculate the tree, inflicting many unpleasant wounds on my hands and arms. In order to disperse the warlike little nation, I sprinkled near a pint of fine guano along the little ridges. This threw them into immediate consternation. I noticed little collections of winged ants huddled close together, and seeming to be quiet, while those without wings ran about in great agitation. The following day not a single insect could be found where the day previous they appeared to be innumerable."

Guano is also said to be a remedy for the striped bug, when put on cucumber hills, taking care not to sprinkle it on the leaves.

Patent Office Doings.

The following changes have been made in the Patent Office:—Wm. Chauncey Langdon, of Kentucky, Assistant Examiner of Patents, is to be Chief Examiner; and Wm. Reed, of Delaware; Amos T. Jencks, of Rhode Island; Thomas H. Dodge, of New Hampshire, and Isaac D. Toll, of Michigan, appointed Assistant Examiners.

Nutriment of Flour and Potatoes.

One hundred pounds of good wheat flour contain 90 pounds of pure nutritive matter and 10 pounds of water. One hundred lbs. of potatoes contain from 20 to 25 pounds of nutritive matter, consisting almost entirely of starch, and 77½ lbs. of water and inert matter. It requires 400 lbs. of potatoes to supply the same amount of nutriment that 100 lbs. of wheat flour supply. The best potatoes weigh about 64 lbs to the bushel, and a bushel contains 15 1-5 lbs. of nutriment. The common white bean contains about 93 per cent. of nutritive matter.

The Canadian Parliament has passed the bill appropriating between three and four million dollars to the aid of the Grand Trunk Railroad.

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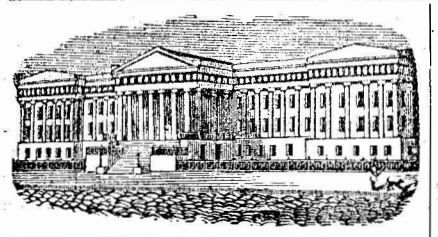

[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office,

FOR THE WEEK ENDING MAY 10, 1855.

CIRCULAR METALLIC PLATE SPRINGS—J. W. Adams, of New York City: I am aware that conical steel plate springs with radiating sections cut out, have been previously used for buffer springs, and I therefore do not claim these.

But I claim the combination and arrangement of one or more flat circular steel plates, D, held in place by a central pin, B, and allowed to spring a limited space between solid convex and concave metallic plates, B' and C, in the manner and for the purpose described.

[By this arrangement of plates the car rests upon the circular steel plates, D, which yield so as to produce therequired elasticity, whiletheconcave plates preventthespring plates yielding beyond a certain point, so that they cannot be strained too much, nor their elasticity impaired by overpressure.]

SLEIGHS—D. S. Barber, Almon Thompson, and DeAlgeroy Thompson, of Pittsfield, Vt.: We claim the attachment of wheels to a sleigh to operate in the manner substantially as described.

VENTILATING AND COOLING APPARATUS—J. R. Barry, of Philadelphia, Pa.: I do not claim the devices described for excluding dust from railroad cars, separately. Nor do I claim the passing air through an ice reservoir for the purpose of cooling the same previous to its introduction to an apartment.

But I claim the arrangement of a fan and one or more refrigerating wheels, or their equivalent, with the water tanks, ice reservoir, and return air flue, substantially as described, for securing effectual ventilation and cooling the air, in the manner and for the purpose set forth.

RGSIN STILLS—Francis Bowman, of Somerville, Mass.: I claim, first, the arrangementof section, G, of the still, A, by inserting the metallic tube, B, and section of a tube, E, covered with glassinside and outside, or a similar tube notcovered with glass projecting at any distance from the inside toward the center of section G.

Also the suspension of the inverted bowl, C, covered with glass inside and outside.

I also claim the formation of an arch under the still, A, constructed of fire brick, soapstone, or any other substance o prevent the fire from touching the bottom of the still.

DOUBLE-ACTING SPRING HINGES—H. E. Canfield, of New York City: As I am aware that flat coiled springs, secured in hollow cylindrical chambers have been before used in making double-acting spring hinges, therefore I disclaim their invention.

I claim the attachment to one pin of two flat coiled springs, coiled in opposite directions in combination with the holder, K, or its equivalent.

WINDOW SASH FIXTURES—H. S. Chaplin, of Glover, Vt. I do not claim the application of a friction spring or bolt to a window frame and sash, and for the purpose of either holding by friction the said sash at any elevation within the limits of its motion, or of locking said sash, so that it may not be either raised or lowered from the outside of the window.

But I claim arranging two spring friction bolts, their retractive arms, cams, and one rocker shaft together and with respect to two window sashes, and so as to operate substantially as specified.

GALVANIC BATTERIES—C. T. Chester, of New York City: I claim the arrangement described for fastening and connecting the battery plates, viz., clamps of brass or such other metal as will alike answer the purpose of the arrangement attached to the insulating bar of wood commonly used in Smee's Battery in such manner that the battery plates clamped to them shall be separatefrom the wooden bar and the solution be prevented from finding its way by capillary attraction, to the wood and which shall, by their form allow of an easy removal and replacement of each separate plate without the disturbance of any other part of the battery arrangement, as set forth.

SEWING MACHINES—John Chilcottand James Scrimgeonr, of Brooklyn, N. Y.: We are aware that sewing machines have been constructed so that their feed mechanism might be varied to run the seam either longitudinally with or circularly round a cylindrical mandrel by substituting one set of feeding rollers for another, and that these rollers have been arranged on one side of the material being sewn to operate in connection with bearing rollers on the other side, to prevent drag, and that such bearing rollers have been made adjustable round the needle to run in either one of the two directions of seam specified; such therefore we do not claim.

Neither do we use nor claim a rotating table with guide on its face to adjust the direction of the seam, as known to be old.

But we claim the arrangement shown and described of the revolving disk, D, within or on the fixed table and having its axis in line with the needle, as specified, when combined to operate together with a roller, E, bearing on the opposite side of the cloth, and made adjustable to any position in a circle round the center of the said disk to vary with facility and dispatch the run of the seam in lines on any side of the needle without the aid of guides on the face of the table, and whether the revolving disk or bearing roller be caused to move the cloth, as set forth.

[The object of this invention is to obtain a universal feeding movement to feed the cloth in any direction, and to change the direction of it, as often as may be desired. This is accomplished by the devices and their arrangement claimed.]

SPLITTING WOOD—J. A. Conover, of New York City: I claim the movable bed or carriage for carrying and advancing the blocks of wood in combination with the reciprocating cutters operating at right angles with the surface of the bed or carriage, substantially as and for the purpose specified.

I also claim, in combination with the bed or carriage and reciprocating cutter, substantially as specified, the employment of the clearing plate through which the cutters pass, substantially as and for the purpose specified.

And finally, I claim providing the said clearing plate with an elastic pad and imparting to it an up and down motion, substantially as specified, in its combination with the bed or carriage, and reciprocating cutter, as specified by means of which the said plate under the combination specified, performs the double office of holding the blocks and clearing the cutters, as specified.

CARDING GUIDES FOR SEWING MACHINES—H. W. Dickinson, of Hartford, Conn.: I claim, first, a holder or presser to a sewing machine formed with a groove to hold a cord in its place while being stitched into cloth or other material, for the purpose of forming a corded seam, in the manner described.

Second. I claim forming the face or bearing side of an adjustable guide with grooves so arranged as to receive and act upon a finished corded seam, and guide the cloth parallel while stitching another seam or sewing in another cord, as described.

VELOCI-TRAT LUBRICATOR—George Dixon, of Lafayette, Ind.: I claim providing oil cups of crank pins and other movable journals with a valve, C, constructed, arranged, and operating as described

HOMINY MACHINE—Esra Fahrney, of Mount Morris, Ill.: I do not claim the self-acting slides, E E, separately, nor the wheel, L, with cams for operating the same, as these devices are well known as the feedmovement of graiumills, seed planters, &c.

But I claim the employment of the two self-adjusting slides, E F, with the two cams, K K, arranged a short distance apart on a wheel having a slower motion than the beater shaft, essentially as shown and described, and for the purpose as set forth.

[This hominy mill has a revolving shaft with radial beaters operating inside of a cylinder; the object of the improvement is to render it capable of self-feeding and discharging. The cylinder has self-adjusting slides over the inlet and discharge passages; these are operated by cams, which are operated so as to feed the corn and discharge it when cracked in a correct and proper manner.]

GAUGE FOR SLITTING LUMBER—F. P. Hart, of Chandlersville, Pa.: I claim, first, the employment of a rotary cutter secured to the shaft of the gauge, when the said shaft screws into the stock, and is made capable of turning freely therein, as described, for the purpose of gauging taper work.

Second, attaching the adjustable scriber, f, by a hinge joint, constructed with a shoulder, g, substantially as described, to the slider which carries it, so that it may be rigid when extended for mortising, but may fold in the recess in which the said slider works when the gauge is used for other purposes then mortising.

Third, the employment of a round-faced guide piece, F, fitted to slide within the stock of the gauge, so as to be withdrawn into it when the gauge is to be used for straight work, but to be protruded from it when required to serve as a guide for gauging curved, circular or irregular work, as fully set forth.

[The nature of the improvement is clearly set forth in these claims. The third claim embraces a combination of devices very suitable for saddlers and other workers in leather, as well as workers in wood, as a sharped edged rotary cutter may be substituted for the toothed wheel used for wood, and thus cut out any curved or irregular work with rapidity and decision.]

MITER AND BEVELING MACHINE—Lorton Holliday, of Rogersville, N. Y.: I claim the manner specified and shown of arranging and combining the several parts constituting the miter box described; this arrangement and combination rendering the saw guide capable of being adjusted in the path of a horizontal circle, as well as in the path of a vertical circle, to any angle desired, and enables the saw to cut a bevel lap on the strip or board, simultaneously with the sawing of the miter or angle, and also indicates the angle cut, substantially as set forth.

[The saw guide in this miter box is very flexible, as it is capable of being changed and set to perform the different operations set forth, viz., to form a bevel lap on the board simultaneously with cutting the miter. The machine has also a revolving disk, carrying a pointer which designates, on a scale, the angle to which the saw guide is adjusted.]

CONDENSERS FOR FIBROUS MATERIALS—W. H. Howard, of Philadelphia, Pa.: I claim, first, the combination of the several parts described, for conducting and condensing the fibrous material from the doffer of a carding engine to the spool, to wit, the two sectional rolls working in contact with each other, and the upper one in contact with the doffer for doffing and conducting the sliver from the doffer.

The two series of convex disks mounted upon the shafts in front of and parallel to the said rolls with the guide plate to govern the position of the slivers between the said disks for twisting, and condensing the slivers as they are conducted from the doffer to the spool, substantially as set forth.

The manner of constructing the upper part of the guides, g g, of the journals of the spool, F, to wit, making the outside portion thereof form parts of levers, h h', whose operation is controlled by a bar or weight, N, and a catch, I, substantially in the manner described and for the purpose set forth.

[The advantages of the improvements embraced in these claims are set forth on page 404, Vol. 9, SCI. AM.]

ADJUSTABLE TENONING TOOL—T. J. Knapp, of Philadelphia, Pa.: I do not claim the cutters, G H, for they have been previously used.

But I claim the construction of the tool, as shown and described, viz., having two segments, D D, of a cylinder secured to the flanch, B of the shank, A, by screws, b b, and having screws, c c, d d, pass through the flanches, E E, and projections, e e, of both segments for the purpose of allowing the segments to be placed nearer together or further apart, as desired, and having a hub or boss, C, at the center of the face of the flanch, B, to receive the rings, I, of different sizes corresponding to the diameter of the tenons to be cut, and by which rings the segments are properly adjusted the required distance apart, for the purpose of cutting tenons of various sizes, as set forth.

[This improvement relates to cutting round tenons on the ends of wheel spokes. The tool is constructed in segments, and can be set to cut tenons of different sizes by merely using rings of different sizes according to the diameter of the tenons to be cut. It is a convenient improvement.]

SPARK ARRESTERS—David Matthew, of Philadelphia, Pa.: I claim the annular space between the base of the smoke pipe and the section extending down into the smoke box with the exhaust pipes underneath, arranged as and for the purposes set forth.

CURTAIN FIXTURES—Perches Miles, of Hartford, Conn.: I claim the combination of the cords, d g, with the tassel, C, and cam lever, the whole being arranged and operating in the manner set forth for the purpose of making a simple neat and effective curtain fixtures, as described.

COTTON SEED PLANTERS—A. H. Morrel, of Marlin, Texas: I claim the combination of sliding bar, J, coverer, H, cam, G, and eccentric shaft, I, or their equivalents, arranged and operating substantially as set forth.

SECURING BRACE BITS IN THEIR SOCKETS—E. W. Nichols, of Worcester, Mass.; I do not claim the projections, B d, upon the spring, f.

But I claim the burr nut, a, or its equivalent, in combination with the springs, f, operating upon the wedge principle (by the use of the screw) the projections, B d, for the purpose and in the manner described.

JOINT BODIED CARRIAGES—A. H. Niles, of Georgetown, N. Y.: I claim the application to joint bodied buggy wagons, and light carriages, of the described additional joint and spring or any other substantially the same, or which will produce the intended effect.

REGULATING WINDMILLS—Francis Peabody, of Salem, Mass.: I claim regulating the action of the wind upon the wheel by means of the disk, A, constructed and operating in the manner substantially as set forth.

ATTACHING HUBS TO AXLES—J. M. Perkins, of New York City: I claim attaching hubs to axles by having segment projections b, attached to the back end of the hub and lips, d, on the inner surface of a cap, F, which is placed loosely on the arm of the axle, said lips being fitted over the projections by turning the cap, and prevented from moving off of the projections upon the backward movement of the wheel or vehicle by the pin, H, as shown and described.

[The pin, H, in this claim, passes through a hole in the cap, and by using a key, this pin can be forced free from the cap in a moment, so as to detach the wheel from the axle with great rapidity. This invention is a very simple, cheap, and efficient one for the purpose stated.]

WINDOW SHUTTERS—G. W. Phipps, of Philadelphia, Pa.: I do not claim a lifting or sliding shutter made of slats or sheets; neither do I claim the peculiar shape of slats, as they have been before made in different shapes and forms; nor do I claim any particular mode of raising the same.

But I claim the peculiar form of the side grooves in the frame tapering from the bottom to the top, increasing with the additional thickness given by the shutters in being lifted.

I also claim the supporting top bar and its grooves, and vertical side bars, as and for the purposes described.

I also claim the combination or arrangement of the upper bar, the vertical bars and the slats to produce the effect alleged, or any other substantially the same.

STEAM ENGINE VALVES—J. A. Reed, of New York City: I have added a water cylinder and the necessary apparatus to operate the same in connection with the valve rod and valve, with a view to show the simplicity of my invention, and its applicability in forcing water as an engine; no part of the water apparatus however is claimed.

I also claim beveling the edges of the cylindrical valve or its equivalent, and beveling the edges of the steam ports, whereby I am enabled to move the valves within the ports, the beveled edges of the ports thus being valve seats, and the beveled edges of the valves being faces to fit thereto, as set forth.

SLIDE LATHE—E. K. Root, of Hartford, Conn.: I claim giving to the tool post slide a motion towards or from the line of the axis of the mandrel by means substantially as described, or any equivalent therefor, in combination with the longitudinal feed motion of the carriage and derived therefrom or bearing a certain relation thereto, substantially as described.

HOT AIR FURNACE—S. J. Russell, of Chicago, Ill.: I claim the employment of the vertical trunks, E F, horizontal pipes, I, and horizontal plates, K K, connected with the fire chamber, B, and enclosed by a casing, A, when arranged substantially as shown and for the purpose set forth.

[The object of this improvement is the saving of fuel, by having a great amount of heating surface exposed within the air-heating chamber. The smoke and heated air pass from the fire chamber into the trunks and pipe, I, and then out into the smoke pipe The air to be heated for the rooms is made to pass back and forth through a circuitous hot-air chamber, to take up the heat economically.]

BUTTER COOLERS—J. H. Stimpson, of Baltimore, Md.: I claim the improved butter cooler, the same consisting in the doublewall cover and reservoir, with a diaphragm or shelf between them, in the manner and for the purpose set forth.

I claim making the support for the butter knife upon the cover or handle, one or both, so that the knife cannot be put in place without closing the lid, thereby securing the economy of ice and the hardness of butter.

MACHINE FOR POLISHING SOLES OF BOOTS AND SHOES—J. H., J. M., and H. Q. Thompson, of Holderness; N. H.: We claim a machine for polishing the soles of boots and shoes, having a polisher or polishers made of bone or other proper material, attached to a shaft, which has a reciprocating motion imparted to it in any desirable manuer.

MACHINES FOR CREASING THE EDGES OF LEATHERN STRAPS—Wm. McK. Thornton, of Pottsville, Pa.: I claim the movable collars 1, 2, 3, &c., of different sizes, on shaft F, in combination with the movable metallic creasers, I I, on shatt H, having flanges extending below the periphery of the collars and shoulders with grooves, b b, operating in the manner and purposes set forth.

TEMPLES FOR LOOMS—J. C. Tilton, of Sanbornton Bridge, N. H.: I lay no claim to the spring jaw temple, made and operated as described.

Nor do I claim the stationary or inflexible spur plate temple made of a rigid bar provided with pins or points inclined at an angle to the direction in which the lay beats up.

But I claim the combination of the serrated spring hook and the spring cloth bender, as applied and made to operate together, substantially in the manner specified.

PLANING MACHINERY.—Leonard Tilton, of New York City: I do not claim any of the parts of the machine described, irrespective of the devices shown, for admitting of the adjustment of the feed roller and cutters, with the exception of these devices the parts described are substantially the same as the Woodworth and other planing machines.

I do not claim the feed rollers and cutting cylinder for planing planks or boards, for they have been previously used.

But I claim, first, hanging the axes or journals of the upper feed rollers, D', in suspended bearings, a, attached to the rods, b, in the manner and for the purpose shown.

Second, I claim adjusting the cutting cylinder, B, by having its bearings, h h, attached to vertical slide rods, i, operated by the bevel wheels, m, l, and screws, j, and securing the cylinder at the desired hight by means of the clamps, N N, and rod, O, as shown and described.

Third, I claim the employment or use of the guide rod, T, and guide, r, arranged as shown, for the purpose of keeping the adjustable cutter, R' firm and steady while operating and causingit to be adjusted with facility.

[The operation of this machine, so far as the operation of planing boards is concerned, is precisely similar to other machines in use—the feed rollers forcing the boards underneath the cutting cylinder, but the manner of adjusting the feed rollers, embraced in claim 1, is entirely different. By merely turning a shaft, both of the suspended upper feed rollers are raised or lowered to suit either planks or boards of varying thickness, and they can also be inclined for boards that are thicker at one side than the other—unevenly sawed—and thus prevent undue strain upon the bearings. The manner of raising and lowering, and securing the cutting cylinder at any hight embraced in the second claim, and the manner of adjusting the cutter and keeping it steady while operating, embraced in claim three, are also very convenient and useful improvements.]

SPRING CURTAIN ROLLERS—B. B. Webster, of Boston, Mass.: I do not claim stopping the curtain when rolled up or partly so, by means of friction merely, as that is done in ways not new. Neither do I claim a spring, a, to be, or which is, compressed by unrolling the curtain so as to cause the same to roll up again, when the spring, a, is let into action.

But I do claim in combination with spring, a, the friction spring, c, or its equivalent, combined and operated by a cord, A, so as to stop the rolling up of the curtain or to cause the same to roll, or to hold the same at any point required substantially as set forth.

COMPOSITION FOR FILLING IN FIRE PROOF SAFES—David Weiser, of Milwaukie, Wis.: I claim the employment and use of the composition of matter, substantially as set forth, as a fire-proof filling or lining for fire-proof safes or other rooms, compartments, or places required to be made fire proof.

FURNACE GRATE BAR—Robert Wicks, of New York City: I claim the construction of the grate bars of furnaces with dovetails, or other analogous interlockments, so as to connect the bars together, keep them from twisting out of place or sliding from the bearing bars while affording the greatest facility in removing defective and inserting new bars.

MACHINE FOR CUTTING IRREGULAR FORMS—J. S. Barber, of Boston, Mass. (assignor to R. J. Marcher, of Blooming Grove, N. Y.: I do not claim the revolving cutters with rollers upon their shafts when the latter revolve in fixed bearings.

Neither do I claim the forms or patterns to which the blanks are secured.

But I claim the described machine for turning ovals, consisting essentially of the sliding cutters, r, in combination with the table, C, and pattern, F, connected together and operating in the manner substantially as set forth.

DRESSING SEWING THREAD—J. M. Heck, of Plymouth, Conn (assignor to Henry Terry,): It is not the composition itself, used for the size, nor any particular arrangement of machinery for applying it, that constitutes the claim I intuend to embiace in this specification.

But I claim the using, or in other words subjecting the thread to the use, action and friction, of a series of rapidly revolving brushes, to polish, soften, and dry the thread after having sufficiently saturated it with a size or liquid substantially such as described; whereby smoothness, luster, pliability and strength are imparted to the thread.

MACHINES FOR TAKING VOTES.—Samuel Huffman, of Charleston, Ill. (assignor to himselfand C. D. Hay): I claim the use of transparent tubes, or their equivalents, provided with index scales for the purpose of showing the number of votes on either side of a question by indicating the number of balls which have passed into each tube, substantially in the manner set forth

FLUID METER—Joh Taggart (assignor to John Taggart, and J. S. Shailer,) of Roxbury, Mass.: I claim my improved automatic fluid meter, as constructed and made to operate substantially as described, that is to say, of the following elements or their mechaical equivalents in combination, viz.

First, two chambers, a b, united by a rectangular or square neck or passage, c, made of a width greater than the thickness of the vibrating piston or plate extended through the neck.

Second, an induction pipe or opening, c, in the upper chamber.

Third, Two eduction passages, k l, and valves applied to the lower chamber.

Fourth, a vibrating plate, dasher, or piston, D, extending from one chamber, a, into another chamber, b, as described.

Fifth, a mechanism applied to the eduction valves, whereby they may be ultimately opened and closed by the vibrating plate or dasher, during its movement, as described.

GRAIN HARVESTERS—B. N. Nicholson, of Davidsonville, Md., admr. of the estate of J. F. Nicholson, dec.: I claim making the space through which the grain passes, in the form of a rhombus, for the purpose of depositing the grain in a line out of the track of the horse, as described.

MACHINERY FOR SPINNING—Arad Woodworth, 3rd, of Boston, Mass.: I claim the use of one or more inner flyers, arranged in a sequence, one within the other, to revolve in the same or different directions, or at the same or different speeds with the outer flyer, all the flyers acting continuously upon the roving yarns or material first received by the outer flyer, until the spinning or twist is completed, and the yarn or yarns are wound upon the spool or bobbin, thereby twisting and spinning more rapidly and attaining any desired degree of twift in yarns, as described.

SPRINGS FOR CARRIAGES—M. G. Hubbard, of New York City: I claim forming the fulcrum of the springs, as described, by connecting them by a clip and bolt at their crossing point, as specified.

ADDITIONAL IMPROVEMENT.

"SAWING AND PLANING CLAP BOARDS—Ephraim Parker, of Rock Island, Ill. Originally patented Dec. 20, 1853: I claim the peculiar mode of hanging the front cutter or plane, or its equivalent.

Also the manner of hanging the saw or its equivalent, so that they will adapt themselves to the different thickness of boards.

I claim them in combination as set forth, or either one when operating separately.

RE-ISSUE.

REDUCING METAL BARS—D. H. Chamberlain, of Boston, Mass., assignor to C. G. Howard, of Boston, Mass., assignor to Peter Cooper, of New York City. Originally patented Jan. 18, 1853: I claim the method of rolling bars or rods on four sides, by the combination of three rollers, arranged with the axes of two of them parallel, and the third at right angles thereto, substantially as specified, whereby two opposite faces of the bar or rod are drawn between the two rollers on parallel axes, and the other two faces between the periphery of the third roller and the face of a cavity formed in one or both of the other rollers, as specified.

I also claim, in combination with the three rollers combined and arranged substantially as specified, the employment of the bolster, substantially as specified, to prevent the forming of a fin on the bar at the junction of the two parallel rollers, as set forth.

DESIGN.

EQUESTRIAN STATUE—Clark Mills, of Washington, D. C.

Smelting Copper Ores.

The most abundant ores of copper are pyrites, or a mixture of sulphuret of copper and earthy matters. The principle of smelting copper depends on iron having a stronger attraction for sulphur and oxygen than copper has. When ores are first exposed to heat, a portion of sulphur is driven off, and the metals become partially oxydized. On fusing, the proto-sulphuret of iron acts as a flux for the earthy matters, which float on the surface of the denser portion of the fused mass, and are drawn off as slag, with an iron rake. By a repetition of similar operations, the remainder of the iron and sulphur are got rid of, and the copper is left comparatively pure. This mode of operating is liable to several objections; the whole of the sulphur is wasted, a great part of which, passing into the atmosphere, occasions much nuisance and damage around the works. The mode of separating the slag by skimming is defective, as copper must either be drawn away with the slag, or slag left with the copper. There is no certainty by this process of obtaining copper in an actual state of purity. Various modifications of this plan have been proposed as improvements, but the best mode of obtaining copper in a state of purity is by what may be termed the wet process, which consists in converting the metallic sulphurets into sulphates, and precipitating the copper in solution by means of iron. This is not a new process, but some improved modes of operating are recommended. The raw sulphates should be first mixed with a portion of oxydized metals, and the mixture placed in a bed, so arranged that warm air may be forced upwards throughout the entire mass, while water is occasionally thrown over it to carry off the sulphates in solution as they form. Granulated metallic iron may be prepared by treating hematite iron ore, or any artificial oxyd of iron, with carbon, steam, and moderate heat. Tanks or vats should be prepared, having an arrangement at bottom for distributing liquids uniformly over the entire area. The vessels are to be filled with granulated iron, and the mixed solution of sulphate of iron and sulphate of copper run in from such an elevation that it may rise through the iron by ascending filtration, depositing copper, and passing off at top as an entire solution of sulphate of iron. This is to be continued until the whole of the iron is converted into copperas, when it is to be removed and purified by fusion in a furnace designed expressly for the purpose.

[The above is from the *American Mining Journal*, and relates to a very important subject. A few years ago great expectations were formed from the employment of galvanic agency, in the deposition of pure copper from its solution, but so far as we have been able to learn, no process of this kind is at present practiced, owing, it is said, to its greater expense.

Implements of War.

The manufactory at Harper's Ferry turned out, last year, 9,000 percussion muskets and 2,761 percussion rifles. At the Springfield armory the manufactures include 11,000 percussion muskets, and 2,000 cavalry musketoons. The cost of the finished musket at Springfield armory, during the year, is reported at $10 61, and at Harper's Ferry at $11 98; that of the finished rifle with steel barrel is stated to be $12 32.

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TO CORRESPONDENTS.

O. O. Y. R., of Baltimore—It would be unprofitable to discuss the question of drought at further length. You surely know that great droughts take place where wood is used for fuel as coal; soot does not, at this day, require to be sent to the chemist for analysis, to discover an alkali in it. This has been done years ago. Our droughts generally take place at seasons of the year when but little coal is used In England coal alone is used for fuel; we never hear of a drought there.

T. J., of Va.—Address Emory & Co., Albany, N. Y., for thrashing machinery.

D. G. B., of N. Y.—We have sent Patent Laws; you will see in Sec. 6, page 10, that the law expressly requires the patentee to stamp the date of the patent on the article. If the patentee omits to comply with the law he is liable to a fine of $100 for each offence.

S. T. C. C., of N. Y.—Stillman A. Clemens, of Springfield. Mass., obtained a patent for the use of the sponge in car ventilators, Nov. 22, 1853; resides in Springfield, Mass. $2 received. Paper will be sent.

G. W. R. B., of La.—Address Bunce & Co., engine makers, 26 Washington, N. Y., for the information you desire. Patent Laws sent,

W S. S., of Va.—There is nothing new in your arrangement of pumps.

N L. C., of Ga.—The stocking machine you refer to is a bubble—it has no existence.

M. C. T. P., of Mich.—Your idea of improving the harrow by attaching it to the bottom of a box in which the driver could ride, and in fitting up the box so that rollers could be subsequently used if desired, is a capital one; especially for those farmers who are troubled with a weakness in the shin bones, or who desire to do up their farming genteelly; but your invention is not patentable.

G. W. P., of Pa.—Henry C. Baird, of Philadelphia, is the publisher of the Chemical Dictionary; the price we believe is $5. G. P. Putnam & Co., of this city, are the agents of *Silliman's Journal.* Snow Harris's works can be obtained of Appleton & Co., this city; we do not know their price.

J. G., of Ohio—We cannot give you the information you ask about sawing iron at a white heat, such as how long saws last, and how many a man can keep in repair: all that we know about it is, that the saw must have a stiff blade, and be kept cool by water while sawing the hot iron.

T. P. of N. Y.—On trials for infringement, the jury are to give a verdict in favor of the plaintiff for the actua proven damages, which amount the judge is empowered to treble if he thinks the circumstances warrant.

W. W., of N. Y.—We are afraid that gutta percha would not make a suitable mallet. What kind of wood do you use for mallets? Good beech, we have understood, was the best. Would not a good iron mallet answer? Granite stonecutters use hammers in place of mallets.

F. T. D., of Mass.—Mr. Alfred Hunter, of Washington, D. C., desires us to inform you that he can furnish you with Patent Office Reports for a number of years back.

A. T. B., of N Y.—We instructed the Office to repair your model, and have paid the bill for doing it. It will not be long now, we think, before your case is acted upon. That specification has never made its appearance.

J. S. Leach, of Bridgewater, Mass.—Desires to know who can furnish him with Chapman's work on the American Rifle, and the price. Also the price of Sharpe's Rifle. Will some one enlighten Mr. Leach on these points of inquiry.

M. P. N., of Ct.—Vulcanized india rubber is the only elastic substance that will endure hot air for some time.

T. W., of Tenn.—We cannot give you a rule for setting the journals of axles in their boxes, as required. See an engraving to make spindles properly on page 292, Vol. 5, Sci. Am.

A. S. N., of Vt.—We cannot tell you whether your pill box machinery is better than those in use or not, because we do not know what yours is.

J. L., of Pa.—White glue is now used for dressing silk; gum arabic is the substance used for ribbons. Use them very weak or they will impair the color by making it look gray.

W. P., of Mo.—In our india rubber works the gum is made plastic by passing it between heated rollers, after which it can be molded in dies for bottles or anything else. You can also render it plastic by steeping it in warm turpentine for some days. This latter was the plan once generally used, but now abandoned.

Ellis Webb, of Pennsburg—We cannot tell by your letter or the postmark on the envelope, in which State you live: therefore we cannot address you by mail; we have received no letters patent from you. What is your patent upon? when and how did you send it? where do you live?

G. H., of Canada—The reason you did not get but 22 Nos. of the paper for your dollar was because you omitted to remit the amount o postage. All papers to Canada we are obliged to prepay postage upon, and when you remit again you should not forget to enclose at the rate of 26 cents a year for that purpose, else your subscription will likely to again fall short.

G. M. D., of ——.—The process for gilding silk is by immersing it in a gold solution of aqua regia, and then exposing the silk to hydrogen gas; we have never tried the experiment, but have read the receipt.

W. R. L., of N, Y.—The best treatise on the Locomotive Engine is Clarke's: for sale by Blakie & Son, Fulton street, this city.

L. B., of Md.—The information you ask requires no small amount of time and trouble to furnish; we can only tell you at present that the velocity of the water through the pipe should be about 76 feet per second, less the friction in the pipes, you can therefore calculate by common rules the quantity of water in 76 feet of pipe, and judge of the quantity discharged. You can find rules for calculating the problems in any good good work on hydraulics.

J. P., of Tenn.—You did not read the receipt for blacking published on page 248: india rubber dissolved in hot oil is what you want. See the receipt on the page referred to, published last month in the Sci. Am.

John Johnson & Bro., No. 111 East 18th street—Would like to have parties address them who are ready to make a contract for boring artesian wells.

C. W. S.—We believe we have once informed you that your wind mill was new to us; we have no knowledge of its having been used. Still, perhaps it has.

R. M. H., of Pa.—We don't think there is anything patentable in your engine; the screw has been used, acted upon by steam in a cylinder in a similar way. There is no advantage in making the cylinders conical, and nothing either advantageous or patentable in connecting a number together. Your air propeller is on the principle of James Rumsey's system of propelling, cotemporary with Fulton. There appears to be novelty, however, in the changing of the direction of the water pipes for giving direction to or assisting to steer the boat.

J. V. J., of Mich.—We have never known of suction boxes combined with a wheel, as described by you. You are no doubt aware, however, that Parker used vacuum draft boxes. Your plan, as we understandit, appears to be different, and in all likelihood patentable.

W. H. K., of Conn.—Your plan for obviating the incline of the looms will answer very well, but we are of opinion that it will not do to make the looms into tubes. The parts would have to be made with flanges and packed.

J. A. G., of Ohio—We do not know where you can obtain a good treatise on the smoke nuisance.

J. H. K., of N. Y.—Your letter has been received, and will meet with attention; if we find it to contain new facts on the subject, it will be published.

J. A., of Conn.—Zinc bends more readily when heated to about steam heat. This is all the information we can give you about bending it in strips.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, May 19:—

W. H. B., of Pa., $25; C. M. S., of Ind., $30; O. S. of N. Y., $30; B. & McG., of—$10; A. D. R., & Co., of N. Y., $275; O. D. B., of Mo., $45; W. A. S., of Mass., $100; J. E. C., of N. Y., $25; D. H. G., of N. H., $25; A. & C. N. C., of N. Y. $25; S. & C., of N. Y., $10; M. C., of N. Y., $10; H. & A., of N. Y., $30; S. N. C., of Ill., $10; N. W. R., of N. Y., $25; W. C., of N. J., $25; B. T. B., of N. Y., $30; M. & H., of N. J., $25; J. J., of N. J., $55; A. & G., of Ind., $25; E. D. B., of N. Y., $30; L. M., of Wis., $25; J. P. & W. S., of O., $25; W. & W. F. B., of Mass., $25; E. & M. H., of O., $30; W. H. N., of N. Y., $30; J. H., of Wis., $20; P. Ten E., of N. Y., $25; P. G. G., of N. Y., $55; W. D. P., of N. Y., $25.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, May 19:—

H. T. R., of Mass.; D. H. G., of N. H.; B. H. B., of Pa.: J. E. C., of N. Y.; A. C., of N. Y.; A. & C. N. C., of N. Y.; O. D. B., of Mo.; W. D. P., of N. Y.; J. R. H., of Pa.; A. & G., of Ind.; W. C., of N. J.; M. & H., of N. J.; N. M. R., of N. Y.; A. G., of Ill.; J. P. & W, S., of O.; W. & W. F. B., of Mass.; L. M., of Wis.

Important Items.

Patent Laws, and Guide to Inventors—Congress having adjourned without enacting any new laws pertaining to applications for patents, we have issued a new edition of the old laws, which may be had at our counter or sent by mail. This pamphlet contains not only the laws but all information touching the rules and regulations of the Patent Office Price 12½ cents per copy.

Patent Claims—Persons desiring the claim of any invention which has been patented within fourteen years, can obtain a copy by addressing a letter to this office, stating the name of the patentee, and enclosing $1 for fees for copying.

Models—We are receiving almost daily, models of inventions which have not the names of their inventors marked upon them. This usually prevents us from taking any notice of them whatever. We shall esteem it a great favor if inventors will always attach their names to such models as they send us. It will save us much trouble, and sometimes prevent the model from being mislaid.

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American and Foreign Patent Agency.

IMPORTANT TO INVENTORS—MESSRS. MUNN & CO., 128 Fulton street, New York, Publishers and Proprietors of the Scientific American, having for many years been extensively engaged in procuring Letters Patents for new mechanical and chemical inventions, offer their services upon the most reasonable terms. Patents promptly secured in the United States, Great Britain, France, Belgium, Holland, Austria, Russia, Spain, and in all countries where they are granted. All business entrusted to their charge is strictly confidential. Private consultations respecting the patentability of inventions are held free of charge, with inventors, at their office, from 9 A M., until 4 P. M. Parties residing at a distance are informed that it is generally unnecessary for them to incur the expense of attending in person, as all the steps necessary to secure a patent can be arranged by letter. A rough sketch and description of the improvement should be first forwarded, which we will examine and give an opinion as to patentability, without charge. Models and fees can be sent with safety from any part of the country by express. In this respect New York is more accessible than any other city in our country. Circulars of information will be sent free of postage to any one wishing to learn the preliminary steps towards making an application.

In addition to the advantages which the long experience and great success of our firm in obtaining patsent present to inventors, they are informed that all inventions patented through our establishment, are noticed, *at the proper time*, in the Scientific American. This paper is read by not less than 100,000 persons every week. and enjoys a very wide-spread and substantial influence. Parties intrusting their business in our hands can rely upon prompt and faithful attention.—Most of the patents obtained by Americans in foreign countries are secured through us; while it is well known that a very large proportion of all the patents applied for in the U. S.. go through our agency.

The offices of Messrs. Munn & Co.'s American and Foreign Patent Agency are at 128 Fulton Street, New York; London, No. 32 Essex st., Strand; Paris, No. 29 Boulevard St. Martin; Brussels. No. 6 Rue D'Or.

A MECHANICAL ENGINEER and Draughtsman, experienced in the construction of Stationary and other Engines, with a general knowledge of machinery would like to engage as superintendant of a machine shop. The best of references given. Address W. C. H., Birmingham, Conn. 1*

TREMPER'S PATENT REGULATOR and Fuel Economiser for Stationary or Marine Engines; will regulate better and with less fuel than any other known mode. Also will stop the engine, in case of accident.—The whole combined in one and warranted for governors or valves. Address JOHN TREMPER, 37 6* No. 1 South Sixth st., Philadelphia, Pa.

NEW GAS REGULATOR—The subscriber offers for sale in one lot. or by single States, the entire patent for his Gas Regulator. The machine is simple in construction, correct in principle and accurate to a nicety in its operation. The invention is considered superior to everything ever devised for the purpose, being so constructed that it cannot become clogged by the accumulation of tar or other liquid matter. A chance is here offered for a permanent and profitable cash business. as the rights will be sold on moderate terms.
37 2* J. W. HOARD, Providence, R. I.

United States Patent Office,
Washington, April 23, 1855.

ON THE PETITION of Hiram Dilaway, of Sandwich, Mass., praying for the extension of a patent granted to him on the 21st Aug., 1841, for an improvement in the construction of molds for pressing glass. for seven years from the expiration of said patent, which takes place on the 21st day of August, 1855—

It is ordered that the said petition be heard at the Patent Office, on Monday, the 9th of August next. at 12 o'clock M.; and all persons are notified to appear and show cause, if any they have, why said petition ought not to be granted.

Persons opposing the extension are required to file in the Patent Office their objections, specially set forth in writing, at least twenty days before the day of hearing; all testimony filed by either party to be used at the said hearing must be taken and transmitted in accordance with the rules of the office, which will be furnished on application.

The testimony in the case will be closed on the 26th of July: depositions, and other papers relied upon as testimony, must be filed in the office on or before the morning of that day; the arguments, if any, within ten days thereafter.

Ordered, also, that this notice be published in the Union, Intelligencer, and Evening Star, Washington, D. C.; Daily Republican, Baltimore; Pennsylvanian, Philadelphia, Pa.; Scientific American, New York. and Post, Boston, Mass., once a week for three successive weeks previous to the 6th day of August next, the day of hearing.

S. T. SHUGERT.
Acting Commissioner of Patents.

P. S.—Editors of the above papers will please copy and send their bills to the Patent Office, with a paper containing this notice. 35 3

SEVEN FINE VOLUMES of the London and Glasgow Practical Mechanic's Journal, for sale; being the work from the beginning up to present time; containing about 3000 engravings, illustrative of all the most prominent British and American patented mechanical inventions from March, 1848. to March, 1855, including a list of English patents, together with a vast amount of scientific and other interesting information. Also containing a number of large and splendid copper-plate drawings, which, with the other illustrations, render the work complete as a self-instruction book of mechanical drawings. Price $20 The continuing monthly numbers can at all times be had in New York. Address and remit to MUNN & CO., Scientific American Office.

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STAFFORD'S HALF HUNDRED RECEIPTS—A Pamphlet of 16 octavo pages, containing more than 50 new and valuable receipts. This book should be in the hands of every mechanic farmer, and thrifty housekeeper. Enclose two letter stamps in a letter directed to J. R. STAFFORD, Practical Chemist. No. 4 New street. New York, and the return mail will bring you the book with the postage paid thereon. 37 13

JACK SCREWS AND HYDRAULIC JACKS.—For sale at manufacturers' prices, by FOSTER & LEACH, 26 Broadway, N. Y. 37 13*

DESCRIPTIVE OR ILLUSTRATED CIRCULARS of Machinery, Implements, Plants, Seeds, Stock etc., if forwarded, (post-paid) addressed to the "Secretary of the Adams County Agricultural Society Quincy, Ill." will be filed for inspection and reference of the Members of the Society. 37 2*

THE EUROPEAN MINING JOURNAL, RAILway and Commercial Gazette. A weekly newspaper, forming a complete history of the Commercial and Scientific Progress of Mines and Railways, and a carefully collated Synopsis, with numerous Illustrations, of all New Inventions and Improvements in Mechanics and Civil Engineering. Office 26 Fleet st., London. Price $6 50 per annum. 36tf

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T. H. LEAVITT, Agent and Treasurer,
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THE CHEAPEST HORSE POWER KNOWN. Patented April 1st, 1855.—Simpson's horse power has not a gear wheel about it. and it can be constructed and kept in repair by an ordinary mechanic. It costs less and furnishes a larger per centage of power than any horse power known. For the purchase of rights for the District of Columbia, Maryland, Delaware, New Jersey, Pennsylvania, New York, Ohio, and the New England States, apply to Prof. CHAS. G. PAGE, Washington, D. C. 35tf

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GRAIN MILLS—EDWARD HARRISON, of New Haven, Conn., has on hand for sale, and is constantly manufacturing to order a great variety of his approved Flour and Grain Mills. including Bolting Machinery, Elevators, complete with Mills ready for use. Orders addressed as above to the patentee, who is the exclusive manufacturer, will be supplied with the latest improvements. Cut sent to applications, and all mills warranted to give satisfaction. 34tf

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PORTABLE STEAM ENGINES.—S. C. HILLS, No. 12 Platt st., N. Y., offers for sale these Engines, with Boilers, Pumps, Heaters, etc., all complete, and very compact, from 2 to 10 horse power, suitable for printers, carpenters, farmers, planters, &c. A 2½ horse can be seen in store. it occupies a space 5 by 3 feet, weighs 1500 lbs. price $240; other sizes in proportion.
29 e3w

IMPORTANT INVENTION—Patented 7th June, 1853.—Falconer's Coupling for hose, hydrants, force pumps, etc., is the only coupling likely to supersede the screw coupling, It can be made cheaper than the screw coupling, and excels it in every respect, and after a public trial under the severest tests. it has been adopted under an Act of the Corporation of the City of Washington, for the Fire Department, in place of the screw coupling. For the purchase of rights under the patent, apply to Prof. CHAS. G, PAGE, Washington, D. C. 35tf

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JOHN PARSHLEY, NEW HAVEN, Conn. Manufacturer of Machinists Tools. Has on hand, and is finishing, all sizes of Engine and Hand Lathes, Iron Planers, Upright Drills, Bolt and Gear Cutters, Universal and Scroll Chucks of the best quality and latest style, at extremely low prices for approved paper, and still lower for cash.

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SMITH'S WATER-TUYERES—Prosser's Patent. —These Tuveres are made of wrought-iron and are warranted not to crack by the most intense heat. Also Water-backs and Tables. for kitchen ranges hotels. and restaurants, &c., requiring a constant supply of hot water. THOS. PROSSER & SON, 28 Platt st., New York. 27 tf

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STAVE DRESSER AND JOINTER.—For tight work decidedly the best and cheapest in use. Machines can be seen in operation at SHAW & KIBBES, Shook Manufactory, Buffalo. N. Y., and models may be seen at the office of the agent, JAMES S. POLHEMUS. 117 Pearl street, New York. to whom, or to the patentees, H. & L. D. BENSON, Jackson Susquehauna Co., Pa., any communications may be addressed. 27 13*

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A CLIPPER AMONG THE MONTHLIES.—The NAUTICAL MAGAZINE, devoted exclusively to Maritime interests, embracing shipbuilding, commerce, navigation, and marine engineering, enlarged 96 pages. This work contains draughts of some of the finest vessels of the age with other engravings, and is one of the most valuable publications in the country. Terms, single copies $5 per annum, or $2,50 per volume. Club Rates—Five copies for $20; thirteen copies for $50. Sample copies sent when requested. Address GRIFFITHS & BATES, Editors and Proprietors, 115 and 117 Nassau st., New York. 31

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NORCROSS ROTARY PLANING MACHINE—The Supreme Court of the U.S., at the Term of 1853 and 1854. having decided that the patent granted to Nicholas G. Norcross, of date Feb. 12, 1850, for a Rotary Planing Machine for Planing Boards and Planks, is not an infringemet of the Woodworth Patent.

Rights to use N. G. Norcrois's patented machine can be purchased on application to N. G. NORCROSS, 208 Broadway, New York.

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Science and Art.

Is the Center of the Earth a Mass of Fire.

Many men of scientific attainments believe and teach that the materials of our globe were once in a red-hot molten state, and that the interior of the earth is now a fluid mass of fiery matter. It is a hypothesis which is taught in our colleges, and found to prevail among those who have been termed "the learned in the speculative sciences." Those who teach this hypothesis, have calculated the globe's crust to be only about sixty miles in thickness. In describing the primitive condition of the earth, they assert, that at one time all its matter existed in a state of gas; then, "there came physical and chemical action (loose expressions) in the nebulous mass, producing light and heat, causing a general conflagration, which resulted in the formation of the mineral mass that compasses our globe." "It is generally admitted," says the Rev. John O. Means, in the *Bibliotheca Sacra* for April last, "by geologists, that the result of these chemical combinations producing combustion, was a melted incandescent body, which, by radiation, became solid in the exterior only; thus a solid crust was formed covering a burning fluid mass." The proofs adduced for this interior fire are volcanoes, hot springs, and the increase of heat in deep mines. Those who teach this hypothesis, also assert, that the sun, on account of its immense size, has not yet cooled down to the condition of our globe, but it is passing slowly into that condetion; hence a period must arrive—if true—when the sun will cease to give light, and when it will become a dark body. Strange as it may appear, however, the Rev. J. O. Means, who believes in this theory so heartily, confutes himself in stating what he believes is the cause of the solar light, by attributing it to an atmosphere of burning gas, the sun itself being a dark central body." If it be true that the sun has an atmosphere of burning luminous gas, and his body is a dark object, no stronger argument could be presented against the sun ever being a molten fiery mass.

If the matter of which our globe is composed was once in a state of gas, we do not know of any chemical law whereby it could have become a molten burning mass. All chemical laws are opposed to such a view of the question. Matter in a gaseous state becomes fluid by giving out great quantities of heat; it contains less heat in a fluid or solid than a gaseous state. Steam gives out about one thousand degrees of heat in becoming water. If our globe was once in a state of gas, what has become of the immense amount of heat which must have been given out when it became fluid. It could not become hotter than it was in a state of gas, excepting by compression, the same as air is compressed in a condenser for experimental purposes.

There is no positive evidence that this earth was ever in a molten state, or that its central part is now a mass of fire. The granitic rocks do not exhibit the marks of fire. If this earth had been once a molten mass, they would be a homogenous slag, composed of all the known metals and minerals, but such is not their composition.

There is also no positive evidence that the water in thermal springs is heated by an internal fire in the earth, or that mines, from the same cause, become warmer as they increase in depth. The practical scientific miners of Cornwall attribute the temperature of mines to the decomposition of minerals therein. The copper mines are hotter than the lead mines, and the former mines become cooler as the ore diminishes, although they may be increasing in depth.—The waters of certain mines once hot have become cool as the ore diminished and the shafts descended. Water flowing through mines containing iron and copper pyrites, must produce decomposition, and generate great heat; this is proof against the internal heat of the earth being the cause of hot water springs and heat in mines.

The temperature of mines varies according to the description of rock passed through. This we find stated in a paper recently read before the Society of Arts in London, by A. Mackworth, and published in the London *Mining Journal*. In slate, at 57 fathoms from the surface, the heat was 57° Fah.; in granite 51°·6 Fah.—a difference of more than five degrees. At 200 fathoms, in slate, the temperature was 85° ·6 Fah., in granite, 81°·3 Fah. We can easily account for mines becoming hotter gradually as we descend, by the superincumbent pressure of the atmosphere, and defective circulation, just as the atmosphere becomes cold, as the pressure diminishes on ascending high elevations.

As we find it stated in the *Bibliotheca Sacra* that Prof. Guyot, of Cambridge, intends to publish an exposition of the Creation of the Universe, upon the basis of the *nebular hypothesis*, embracing the internal fire theory as part of it, we hope he will weigh well the arguments of practical geology against his views. We have great confidence in his verity; but the best and ablest of men sometimes come to wrong conclusions, for a want of being able to obtain the whole truth. As this question is now engaging a large share of attention from scientific and religious men, we have presented some objections to the internal heat theory, which we believe cannot be easily answered. Such arguments can be multiplied, but we do not deem this necessary at present.

Whitewash for Outhouses and Fences.

As this is the season of the year when considerable whitewashing is performed, and as we have been inquired of for a good whitewashing receipt by numbers of new subscribers who have not read our receipt in a former volume, we present it again, knowing that a good story is never the worse to be twice told:—

Take a clean barrel that will hold water. Put into it half a bushel of quicklime, and slack it by pouring over it boiling water sufficient to cover it four or five inches deep, and stirring it until slaked. When quite slaked, dissolve it in water, and add two pounds of sulphate of zinc, and one of common salt, which may be had at any of the druggists, and which in a few days will cause the whitewash to harden on the woodwork. Add sufficient water to bring it to the consistency of thick whitewash.

To make the above wash of a pleasant cream color, add 3 lbs. yellow ochre.

For fawn color, add 4 lbs. umber, 1 lb. Indian red, and 1 lb. lampblack.

For grey or stone color, add 4 lbs. raw umber, and 2 lbs. lampblack.

The color may be put on with a common whitewash brush, and will be found much more durable than common whitewash.

A New Oil Plant.

The small tree (*Castigliona lobata*) known in Peru under the name of "Pioncello," and Surco, Huacho, and Sambageque, also growing wild in considerable abundance in those regions, it has been ascertained, yields a valuable oil, well adapted to the purposes of illumination. Its bean-like fruit, or seeds, when roasted, have an agreeable flavor, preferable to that of the olive. When eaten raw, the ethereal oil generated between the kernel and the outer skin is a strong cathartic, the effects of which can only be counteracted by drinking cold water. It has been ascertained that the seeds will grow in Baltimore; and, doubtless, plantations of this tree might be formed in many parts of the South, from which vast quantities of oil might be produced, and thus add another link to the great chain of our national wealth. The Patent Office has taken measures to procure some of the seeds of this tree for trial in the South and Southwest.

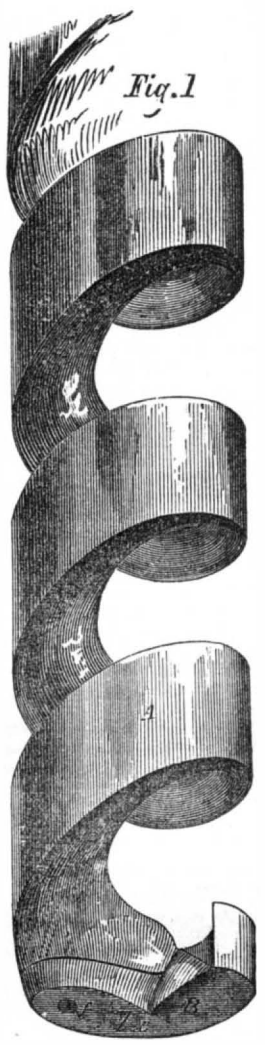
News from Europe.

By the late news from Europe, we learn that an attempt had been made to assassinate the Emperor of the French, by an Italian, who had been one of Garibaldi's soldiers during the brief existence of the late Roman Republic. In spite of all that is said by the correspondents of our daily papers, against Louis Napoleon, the French people seem to manifest great enthusiasm for him.

The siege of Sevastopol was partially suspended, so far as it relates to the bombardment; the batteries of the city appear to be impregnable.

The British Parliament has passed a Loan Bill of £16,000,000, and a determination is manifested to carry on the war with vigor, but the people still find great fault with its management by Government.

Improvement in Augers.



The accompanying figure is a perspective view of an improvement in augers, for which a patent was granted to Isaac W. Hoagland, of Jersey City, N. J., on the 20th of last March.

The improvement is a very simple but a very useful and important one. It consists in having the cutting portion of the auger made separate from the screw, and combining the two parts by means of a dowel and a screw in dovetail form.

A is the screw portion or *stock*, and B is the cutting portion or *bit* of the auger; *e* is the screw which fastens these two parts together; and *f* is a dowel which serves to prevent any play of the cutter independent of the screw, when working. More than one dowel may be used, but one is sufficient, as there is very little pressure upon it.

The object of this improvement is to allow of the screw part of an auger, which endures for a very long time, to be used for any number of the cutting parts, so that the latter can be renewed when required, if broken or worn out.

For ship carpenters the invention is of great advantage. A series of stocks may be made and marked with the letters of the alphabet. To each there may be several sizes of bits marked and adapted to fit accurately, and thus the carpenter, if supplied with a proper number of auger stocks and bits, will be able without loss of time, to bore for any size of treenail. He will thus lose no time, as he now frequently does, in searching for a new auger, or getting a broken one mended, if he should break his bit against an iron bolt. If he wishes to bore for new treenails of a different size from that which he has been using and boring for, he has but to unscrew his *bit* and put on another of a different size on the same stock, to bore a hole of a proper size. As a stock like A, is for permanent use, it may be made of cast steel and polished; this would be too expensive for common augers.

Adaptable *bits*, like this one, have also the advantage of being more easily and better tempered than those forming one piece with the stock.

The improvement can be applied to various kinds of augers used for different kinds of work. As the cutting portion of an auger stands but a limited amount of usage, and is often destroyed by coming in contact with nails and bolts in boring, the whole auger is soon rendered useless and a new one required. All that is required to render this auger always new, is the renewal of the small and simple bit, B.

The claim is for the manner of combining the two parts of the auger.

A part of the right of the patent has been assigned to John W. Hawkes, of Washington Market, this city, to whom letters for more information may be addressed.

Feeding Iron Furnaces.

A new hot blast anthracite furnace has been erected at Williamsport, Lycoming county, in this State, by Messrs. Bingham, McKinney, & Co. The arrangement for feeding the furnace, the *Press* of that place says, is novel, economical, and ingenious. A large stock car with circular iron body and trap bottom, is drawn up an inclined plane to the turned head, by the engine, when the body of the car striking a lever, disconnects it from the gearing, and the car is thence run by hand upon the track over the opening, and the stock deposited by the movement of a lever connected with the trap bottom; returning, the descent of the car is regulated at pleasure, by means of a double break.—[Philadelphia Ledger.

Inventors, and Manufacturers

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